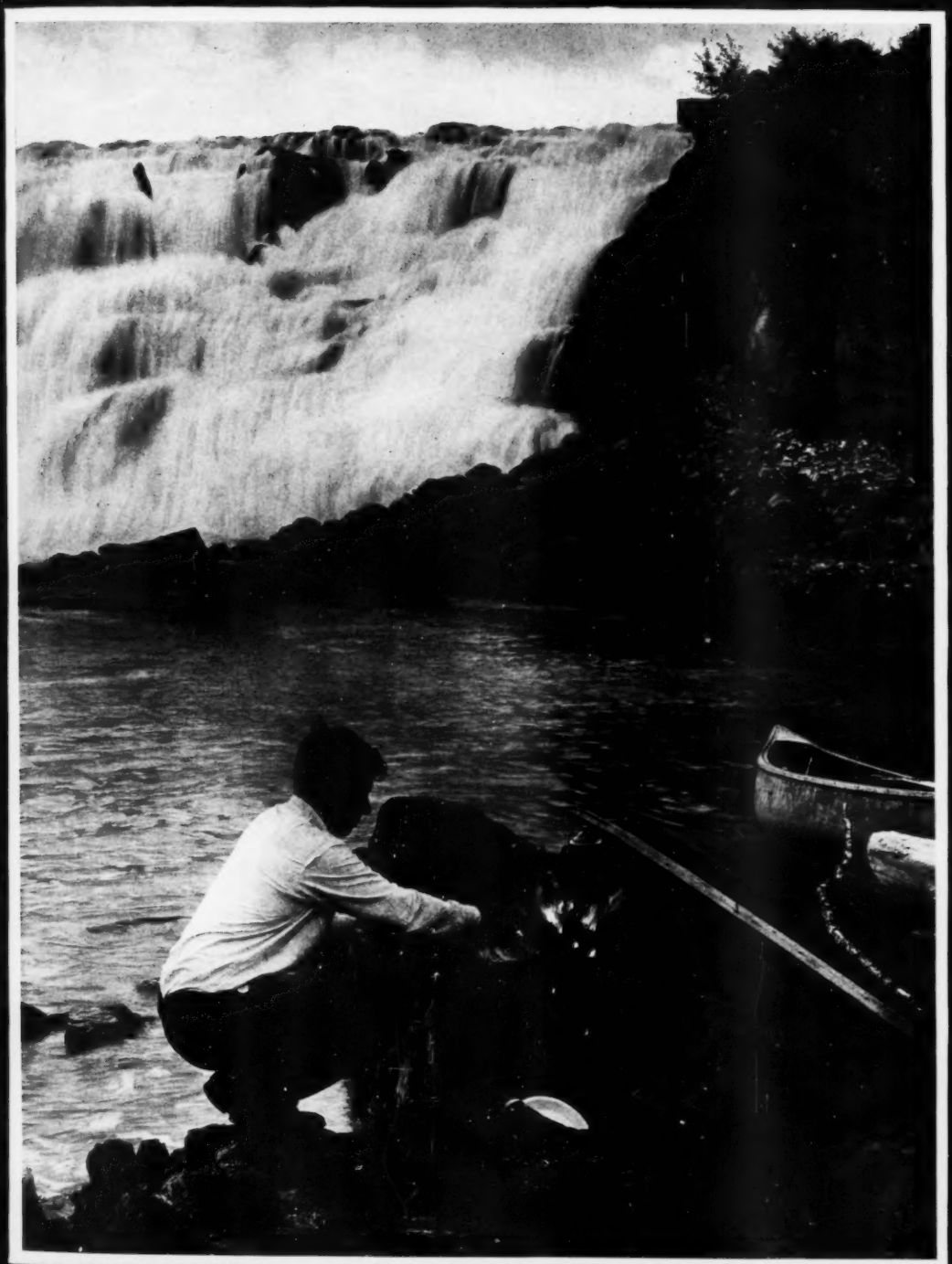
AMERICAN



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BELL TELEPHONE SYSTEM

American Forests

Editor
OVID BUTLER

Associate Editors
LILIAN CROMELIN
ERLE KAUFFMAN

Published monthly by

THE AMERICAN FORESTRY ASSOCIATION

919 Seventeenth Street
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The American Forestry Association, founded in 1875, is a citizens' organization for the advancement of intelligent management and use of the country's forests and related resources of soil, water, wildlife and outdoor recreation.

Its educational activities seek to bring about a better appreciation and handling of these resources, whether publicly or privately owned, that they may contribute permanently to the welfare of the nation and its people.

In addition to publication of two magazines — AMERICAN FORESTS and CONSERVATION, both designed to keep before the people of the country important conservation questions and issues, the Association carries on educational programs in various fields including forest fire prevention, reforestation, protection of wildlife, prevention of soil erosion, preservation of wilderness areas, establishment of national forests and parks, advancement of forestry by private endeavor, the teaching of conservation in schools and the promotion of research in timber growing and forest utilization.

The Association is independent and non-commercial, and has no connection with any federal or state governments. All its resources and income are devoted to the advancement of conservation in the interests of public welfare. All citizens are welcomed to membership.

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Who's Who

Among the Authors in this Issue

JAMES E. MEAD (*Hermit Cruise*) was born in Chicago in 1895 and has lived there, in England and in California ever since. He studied law, but went into business and then found himself with his special line of merchandising — bicycles — "frozen." An outdoor enthusiast and camera fan since his school days in England, his present preoccupation is camping, with fishing as an adjunct. Since a small boy he has loved the woods and camped in the high Sierra, the North Woods and the Great Smokies, varying automobile, bicycle, pack-horse, burro, canoe and foot as transportation. Canoe trips in the North Woods, he finds, offer a complete relief from the mechanization and pressure of modern life. The snap-shot shows him, on his "hermit cruise" early one morning—half-shaven and happy—in the rain.

James E. Mead

EDWARD J. FENTON (*Lightning Over the Forest*) — formerly a member of the writing staff of American Forest Products Industries, Inc., and a newspaper man of New York and Washington, has severed his connections in Washington and entered military service.

LLOYD G. INGLES (*On the Trail of Sierra Wildlife*), educator and lecturer on wildlife, is a conservationist from the ground up. He firmly believes that the forests, soil, water and wildlife twenty years from now are dependent on the conservation efforts of the thousands of teachers in the elementary and high schools of today, and that conservation efforts can be most effective if students and adults know something of the inter-relationship that exists among various wildlife species. Professor Ingles spends practically all his spare time — he teaches biology at Chico University, California—in the mountains and deserts of the West making movies and photographs of native mammals to illustrate his lectures and articles. The snap-shot shown caught him, —"collecting."

Lloyd G. Ingles

REYNOLD E. CARLSON (*The Conquest of Fremont Peak*) is an official of the National Recreation Association. Majoring in recreational work, Mr. Carlson received his A.B. and M.A. degrees from the University of California and has spent most of his life in that state. For several years he taught school, coached and was busy on recreation work in California, serving for three summers as ranger-naturalist for the National Park Service in Yosemite. Six years ago he joined the National Recreation Association as director of its nature activities service and since then he has travelled over the United States, giving one-month institutes to train recreation directors.

Reynold E. Carlson

WILSON POPENOE (*Quinine From the 'Fever Tree'*), formerly a plant explorer on the staff of the Department of Agriculture, is now in charge of research for the United Fruit Company and makes his permanent home in Antigua, Guatemala. He is greatly interested in the development of a vocational agricultural school in Honduras.

Wilson Popenoe

J. ALFRED HALL (*What A Man Wants, He Takes*) was born and reared in the hills of southern Indiana and saw the conversion of the virgin forests of that territory into lumber and eroded hillsides. A Ph.D. in chemistry from the University of Wisconsin eventually led him to the Forest Products Laboratory at Madison, and forest research administration. He is now director of the Central States Forest Experiment Station at Columbus, Ohio.

THE COVER — "The End of a Perfect Day—along the Nipigon." Photograph by John Kabel.

A Prayer
FROM THE FOREST

By LUCILE CRITES

WE, Monarchs of the Forest, bow our heads in prayer to the God who made us—for God creates—and Man, in his thoughtlessness, so often destroys us.

WE PRAY FOR FOREST PROTECTION!

We have spent long years preparing to be the servants of Man, and now implore—though silently, as we must—that our lives be spared.

NOT from the ax when it means lumber to house your family; NOT when we serve, supporting the wires that carry your messages to the far corners of the earth; we do not pray that we be spared the service of heating a home, that your little ones may warm their growing bodies at our expense. Ours is not a selfish prayer. It is of needless sacrifice we speak.

Oh Man, our keeper or destroyer, spare us the agony of Forest Fire! Yours is the shame of a carelessly-thrown match, a cigarette, or a smouldering camp-fire. We weep for the brave, tired men as they blindly fight their way to us through choking clouds of smoke, searing flames of destruction and death.

If, through no fault of ours, we feel disgraced at the sacrilege, should not YOU, Starter-of-Forest-Fires, suffer shame when charred ruins replace a once magnificent forest?

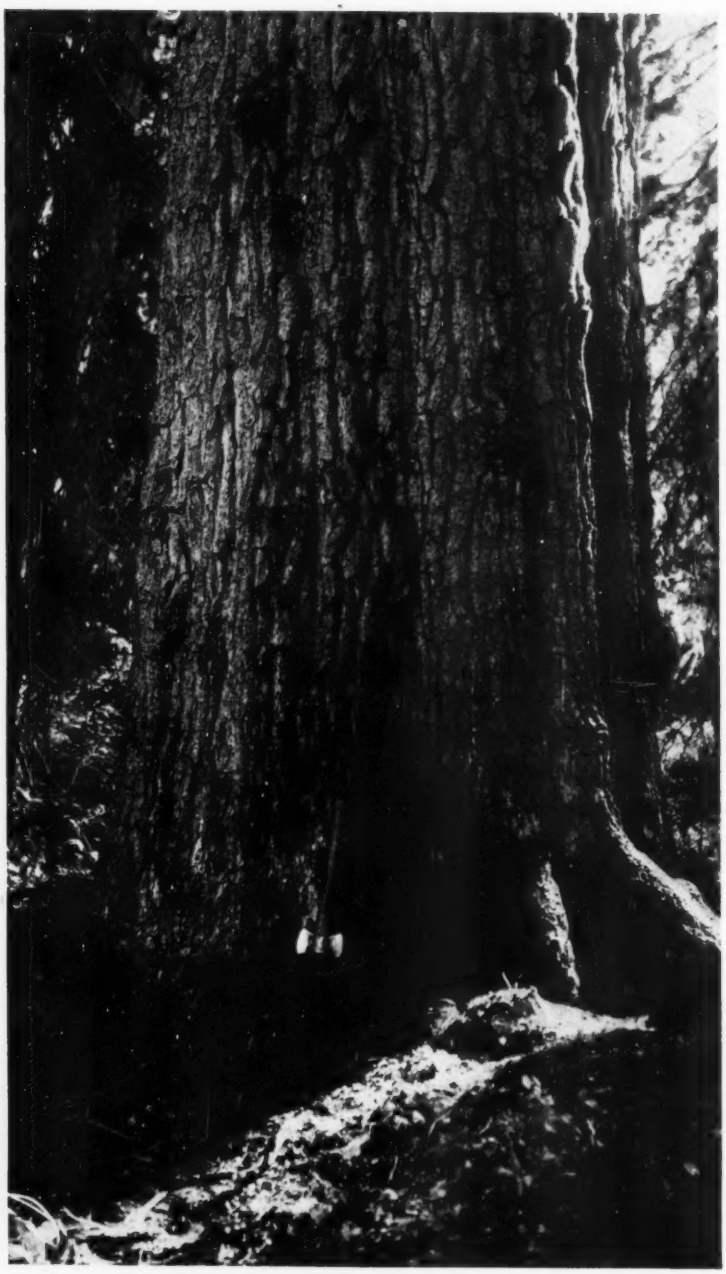
It was not for this end, Oh Man, that we grew, fastened our roots deep into life-giving soil. It was not for this we held our heads high and proud! It was for YOU we weathered storms, and winds blowing hot and cold. It was that we might serve YOU, Oh Man!

We cannot run away when danger approaches—We must stand our ground. You alone can decide what our fate shall be. Will you not repay your debt to us? We bow our heads in prayer, beseeching that you pledge us, and God, maker of trees and men, that you will save us from the holocaust and prevent future Forest Fires. Amen.

BIG TREES

WESTERN WHITE PINE KING

The American Forestry Association is sponsoring a national hunt for the discovery and preservation of the largest specimens of the different species of typical American trees. Locate, measure and nominate your candidate in this competition. ACT NOW to make known and save the largest specimens of America's trees. For further details, send for the Association's special announcement of this Big Tree hunt. Mail your nomination with records and pictures to The American Forestry Association, 919 17th Street, Northwest, Washington, D. C.



The great White Pine on the St. Joe

ON Rocky Run Creek in the St. Joe National Forest of Idaho, stands the largest living western white pine recorded with The American Forestry Association in its search for the largest specimens of the nation's important tree species. This giant, 160 feet tall, and measuring twenty-four feet, seven inches in circumference four and a half feet above the ground, was nominated by Elers Koch, assistant regional forester, U. S. Forest Service, Missoula, Montana. Measurements were made by Neil Fullerton, also of the Forest Service. The tree is estimated to contain 15,500 board feet of timber.

According to Mr. Fullerton, the tree is still in good shape. "The base is hollow," he reports, "but the bark is alive all around the base except in one place where there is a hole near the ground about a foot in size. Another hole is in a rotten burl about eight feet up on one side."

FROM Russia has come a new word for American foresters to gnash their teeth over. It is "kok-saghyz," Russian name for a variety of the lowly and much-cursed dandelion, whose species have circled the globe in wild abandon. Kok-saghyz, however, is a highly bred member of the dandelion tribe. For the past ten years or more Russian scientists have been breeding it up as a source of rubber latex. Last year the Soviet Union cropped 2,000,000 acres of kok-saghyz, obtaining yields upwards of sixty pounds of rubber to the acre.

As everyone knows who has come to grips with dandelions on his own lawn front, the plant has a tough and tenacious root system. The roots of kok-saghyz, it appears, are tougher, longer, and larger than any of its relatives. And therein lies its merits, because the rubber latex content of the dandelion is in some degree proportional to its root system. Despite its large root, however, kok-saghyz's rubber yield on an acreage basis is small compared to that of the guayule bush which foresters are now starting to grow on a large scale in southern California. (See page 347.) But kok-saghyz has this advantage,—it yields a crop every year like sugar beets, whereas guayule takes four years to mature a harvest.

What, it may be asked, have foresters to do with dandelions, and specifically with the Asiatic immigrant, kok-saghyz. The reason, briefly given, is that war has dropped seeds of kok-saghyz into some of their forest experiment stations. With the advent of the rubber emergency in the United States, scientists of the Department of Agriculture became interested in Russia's growing of the plant as a source of rubber. Through the State Department arrangements were made with the Soviet Union whereby several hundred pounds of kok-saghyz seed were flown to the United States this spring and doled out for experimental plantings in some sixty sections of the country. To the Forest Service were allotteed 350 pounds for experimental plantings on lands in Montana, Michigan, Wisconsin and Minnesota. From pines to dandelions may strike some foresters as a descent from the sublime to the ridiculous, but any task that promises to help win the war is today worthy of the doing.

* * *

THE Corps of Engineers of the War Department has announced that forest engineer units are now well along toward organization at Fort Lewis, Washington, in the 9th Corps Area, and at the A. P. Hill Military Reservation, Bowling Green, Virginia, in the 3rd Corps Area. Officers have been selected but their names will not be announced until organization of their units has been completed. The remainder of the personnel is being drawn from enlisted and drafted men already in the Army whose training and experience qualify them for work with forest companies.

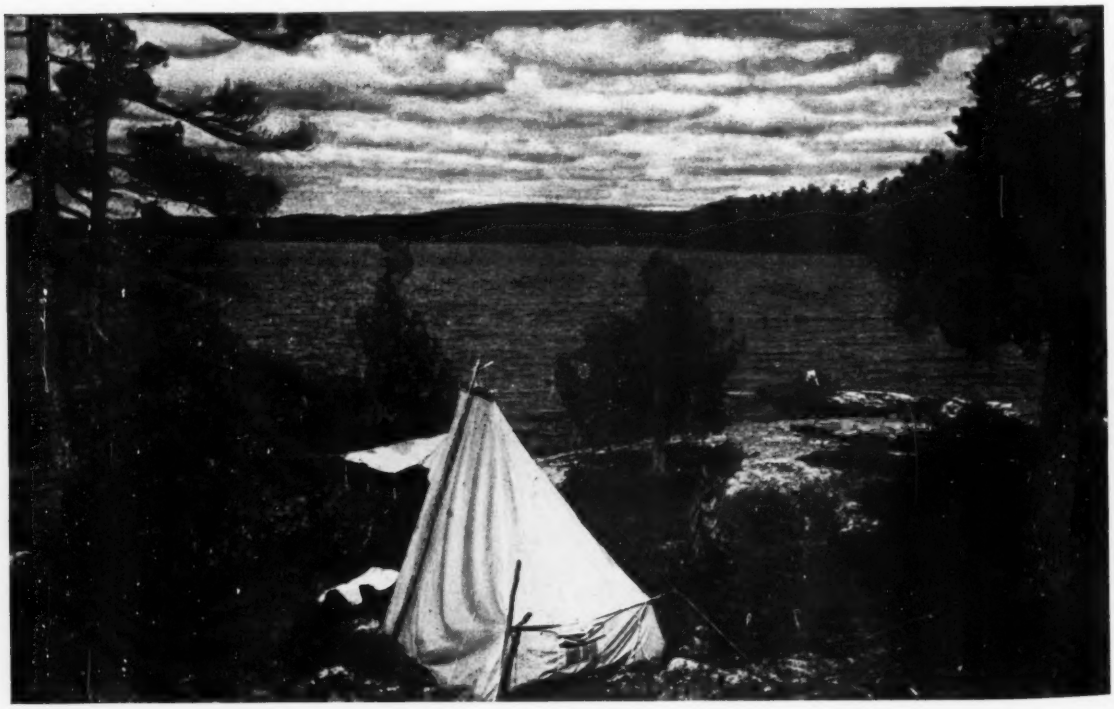
The extent to which additional units may be called for is undetermined and will depend upon military needs as the war progresses. The specific work which the units are being organized to do is not stated but one of their important values will be as trial companies to train men, test equipment and develop organization that can be readily expanded immediately emergency need for forest companies or regiments arises anywhere.

To this editor it would appear that already there is emergency need for a forest regiment. This is in Alaska, where the Forest Service is undertaking to start as quickly as possible the logging of ten million feet of Sitka spruce a month—an increased production desperately needed for our airplane program—towing the logs 1,000 miles to Puget Sound by letting out the work to independent contractors, who will have to get their labor in the open market. In the light of present shortages of both labor and equipment in the Pacific Northwest this procedure may prove impossible of accomplishment.

Labor is not available in Alaska and competition for woods workers in Oregon and Washington is already very keen. Operators in those states are having difficulty in producing at maximum capacity, as Chairman Nelson of the War Production Board has demanded. The government cannot logically disrupt this program of essential production by hiring men away from Washington and Oregon for work in Alaska. Furthermore, the prospect of leaving their families and burying themselves in remote logging camps in Alaska may not appeal to many of these woods workers, who know that their present jobs are equally essential to the war effort. On the other hand, a forest regiment recruited from experienced woodsmen throughout the country and assigned the job of getting out the Alaska timber, just as the Twentieth Forest Regiment in World War I was assigned a similar job in France, would seem the direct line to speedy success.

Ovid Butler

Coming through the sweet scented solitudes, the sudden vista of a new lake is like the raising of the curtain on a brilliant stage — each has its own charm, its own alluring character. (Below) Home is where you make it and there's a new thrill in taking possession of each new campsite



HERMIT CRUISE

AN ADVENTURE WITH SOLITUDE IN THE LAKELAND WILDERNESS OF THE SUPERIOR-QUETICO COUNTRY

By JAMES E. MEAD

A GOOD many people seemed willing to bet that a man couldn't be three weeks alone in the woods and like it; that he'd run for home after the first few days, babbling incoherently to himself. I had my doubts, but was bent on trying it.

And so one bright afternoon in mid-August I set out alone by canoe down Fall Lake from Winton, bound for a rendezvous with solitude in the great lakeland wilderness of northern Minnesota. My destination was a lake which on the map of that vast domain of woods and water had always intrigued me as a virgin refuge to which man had not yet made a beaten portage.

This was my eighth canoe trip in the magnificent Superior-Quetico country, but always before I had had for company my wife and one or more of our boys. Food, duffel and other necessities were stowed away in the bow of my fifteen-foot canoe. My entire outfit weighed 104 pounds, including a small outboard motor and four gallons of gasoline. One Duluth packsack held everything but the tent, a Woods sail silk explorer type weighing twelve pounds. For cooking I carried three aluminum nesting pots with lids, an aluminum frying pan, two tin plates, a bowl, cup and "silver." A small reflector oven and a wire grill were worth their weight, though not strictly necessary.

I feel like apologizing for the motor, which is really against my principles. The noise and smell seem out of keeping with the solitude of the woods. We had used it in previous years to traverse the larger inhabited lakes near Winton and reach, that much quicker, the real jumping-off place for the wilds. Going alone, it appeared wise to take the "kicker" all the way, as the speed of a single paddler seems less than half the speed of two—especially a small man against a big wind.

On a rock in mid-channel, the camera — with its self-timer, caught me slipping along among winding, reedy channels and upthrust rocks, approaching the portage from Moose Bay to Robinson Lake, at the start of the hermit cruise

My entire outfit weighed 104 pounds and one Duluth knapsack held everything but the tent, even including food for eighteen days

Two fishing rods and a spare paddle were strapped to the gunwales to be portaged with the canoe. The gasoline was in four one-gallon cans with a wooden handle uniting them along the top. Thus they could be carried as a single package. In one trip over a portage I handled only the canoe, on the second the packsack with the tent on top, the motor in one hand and the gasoline in the other.

Absorbed in realizing that, at long last, I was on my way, scant attention had been given to the weather. When finally aroused by scattered drops of rain, I was within sight of the Pipestone Falls portage and decided not to stop the motor and unpack my raincoat. After all, it was a light sprinkle. Nature isn't concerned with such trivial considerations, however, and the sprinkle became a downpour. So at four o'clock, and soaked to the skin, I decided to make camp then and there, on Newton Lake.

At a time like this there is a real feeling of friendship for your tent. Its familiar walls make you feel comfortably at home. Friends have asked, "Don't you ever get lost?" I feel that you can't be lost as long as your tent, canoe and food are right along with you. Home is where you make it. There's a thrill in occupying each new campsite, turning the vacant spots into living room, bedroom and kitchen, each time with a new arrangement of furniture.

By morning my clothes were dry and a good south

A noontime stop for lunch on the wooded shore of the waterway between Burt and Susanette Lakes

For the first time — on Burt Lake — I fully realized my aloneness, for not even a faint trail joined me to the distant world from which I had so lately come

wind pushed the canoe through Basswood to the upper falls. Then began the familiar toil along Basswood River. Taking the canoe across the three short portages rather than the single long one seemed easier, but I carried the pack straight through to save time. Two hours was the best I could do on this trail, though I am sure hardened woodsmen could make it in half that time.

The following morning I paused to photograph ancient Indian paintings, and then entered an enchanting region of woods and water. It is the stretch leading through a winding stream from Moose Bay to Robinson Lake. The channel twists among tall reeds, sheltered on all sides by timbered hills. The water is smooth and silent. Huge boulders thrust up here and there, and one is likely to see flocks of ducks paddling along in line. It would be foolish, if not profane, to use the motor here.

Emerging from this fairy channel into lovely Robinson Lake, my mind traveled ahead to a campsite I knew was located on an island toward the northern end. I am sure this must be the finest camping place in the Quetico. It is among big pines, with smaller ones to screen the north and east winds, and there is enough level space, with deep sod, for a dozen tents. Craftsmen among former campers have built a convenient rock fireplace, a large log table, and benches with actual back rests. The only trouble with such an ideal spot is that you rarely find it unoccupied.

I had visited this site but never camped there. So

My ideal camp on the piney shore of Marj Lake, secluded and beautiful. Great fishing, swimming and sunning, — and a fine chance to wash my clothes

I decided to make for it. As it was nearing six o'clock, late for other parties to be coming in, I was optimistic enough to hope I would find it available. But such was not my luck. When a mile away I could make out three canoes drawn up on the shore. So, putting disappointment aside, I waved a cheery greeting to the fortunate inhabitants and continued on to the next island, resigned to a virgin camp.

But even a new camp has advantages to compensate for the extra work and time required to prepare it. Firewood is plentiful and there is no litter to spoil the effect of the wilderness at sunset. Also, the tent may be pitched over deep untrodden moss, which can be used for a mattress. This I was doing when rain began falling and darkness descended. But, with a little extra effort, I was soon snug in bed with the dishes washed and a supply of dry wood stacked under my raincoat.

A lovely body of water, remote and still—with many wooded islands, Joyce Lake, the "end of the trail" — fulfilled every expectation

Morning brought a solid gray sky, ready to drizzle or to pour. With plenty of time, I managed a good breakfast between showers, then washed the dishes and dried them under the overturned canoe. I dislike packing wet equipment if it can be avoided. The tent offered a problem, however, which was solved only when it stopped raining long enough to roll it up without getting water inside.

The goal of my trip was Joyce Lake; in fact, it had become the object of my dreams. It is one of two lakes I can find on the Quetico map where the trail leads in but not out. Medium in size, it is irregularly shaped and dotted with islands to break the wide traverses of open water. With this happy hunting ground envisioned, I planned to push through the six intervening lakes, making one-night stands at each, then settle down on a dream island for a week of loafing and fishing. But, as it happened, it did not work out quite that way.

The going was smooth through Jess and Cecil lakes, familiar territory with short, easy portages. On McIntyre Lake I chose another virgin campsite rather than the splendidly equipped but exposed site midway up the lake. This excellent camp has a two-way fireplace which burns briskly when the wind is from either direction, and built-in rock shelves for warming ovens. But it is on a low neck of land without shelter from either a north or south wind, and if there is anything I try to avoid in camp it is a continuous wind — except, of course, when mosquitos are bad.

Along the northeastern shore of sparkling McIntyre there is a long narrow island, forming a narrow channel. It was here, according to my map, that the portage led over the ridge to Paulene Lake. While seeking this trail, I came upon two young boys fishing in the channel. They displayed ten fine walleyes, four or five pounds each, caught within the hour. I mention this so that any reader, lured into the region, will know where to look for them.

I didn't stop to fish as the next portage would take me into new country, and the appeal of the unknown is always strong. Pleasurable expectations increased at each step as I plodded along the trail with my burden. Coming through the sweet scented forest, the sudden vista of a new lake strikes like the raising of the curtain on a brilliant stage. Each has its own charm, its own character.

Paulene Lake invited further exploration, especially as the map showed long, narrow arms bending back out of sight into the hidden corners of the great woods. But it was already noon of my fifth day and my program called for more travel. Also, while the last portage had been easy enough, trails were becoming less distinct. Anticipation of unspoiled fishing waters surged anew at this mark of little travel, but I was not prepared for (*Continuing on page* 380)

THE GUAYULE RUBBER PROJECT

At Salinas, California, Foresters Are Making Great Strides In the Growing of a Much Heralded Rubber Plant

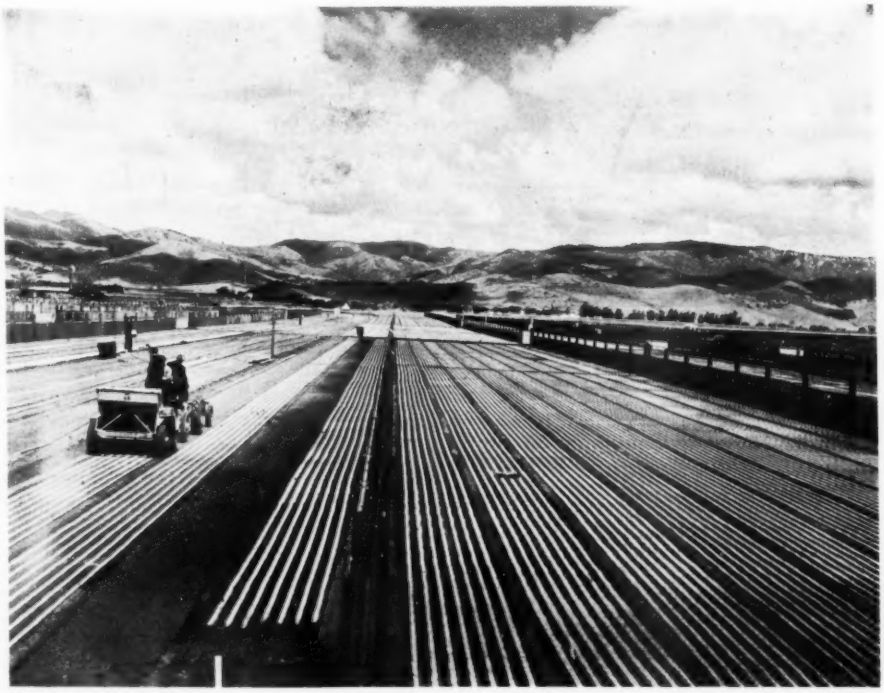
Photographs by the U. S. Forest Service

EVER since Pearl Harbor, a small bush-like plant resembling the western sagebrush has been in and out of the news as one of many possible sources of rubber. The plant is known as guayule (pronounced wy-yuley) — a wildling native to Mexico and southwestern Texas. In late December legislation was introduced in Congress to launch at the earliest possible time a guayule-growing project by taking over the property of the Intercontinental Rubber Company at Salinas, California, where for many years experiments in growing and processing the plant for its rubber content have been in progress. Even before the legislation was passed, the Government had moved to start the project. (See AMERICAN FORESTS for February, 1942.)

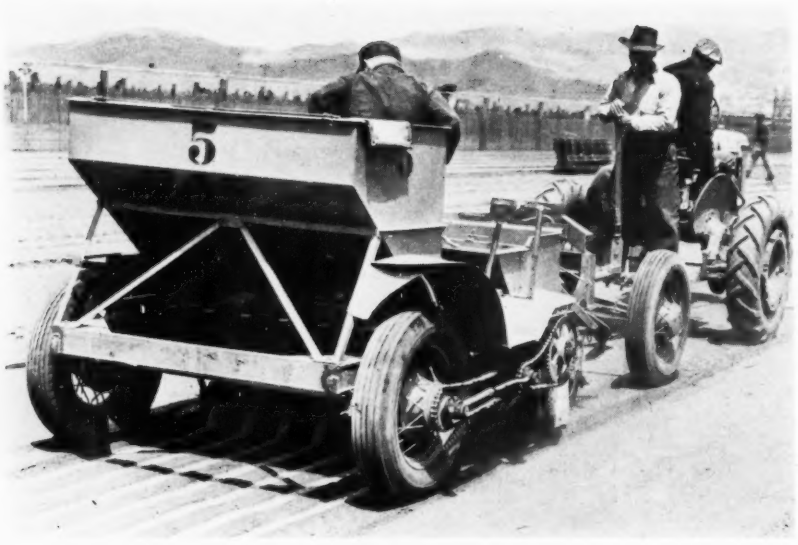
Guayule was one of the first plants advanced as a domestic rubber-producing possibility. Much has happened since it first took the headlines. Unhampered by the confusing controversies which have since plagued the nation's efforts to expand its synthetic and reclaimed rubber production, foresters and their fellow plant scientists have been going full speed ahead laying the ground work for the growing of guayule on a large scale. At Salinas, California, where the work is concentrated, one may see today what already is probably the largest shrub nursery in the world.

The story of guayule's swift rise to prominence is told in part in the accompanying photographs. The legislation which made possible the guayule project was approved by the President on March 2. It directed the Secretary of Agriculture "to provide for the planting of guayule and other rubber-bearing plants and to make available a source of crude rubber for emergency and defense uses."

Secretary Wickard named the Forest Service as the departmental agency to execute the guayule project, with the technical assistance of the Bureau of



Machine sowing of guayule seed at the Salinas nursery, California. In one operation the light seed, mixed with sawdust, is dropped on the nursery beds and covered with white sand. A few weeks later the white strips shown in the picture become green rows, guayule seedlings

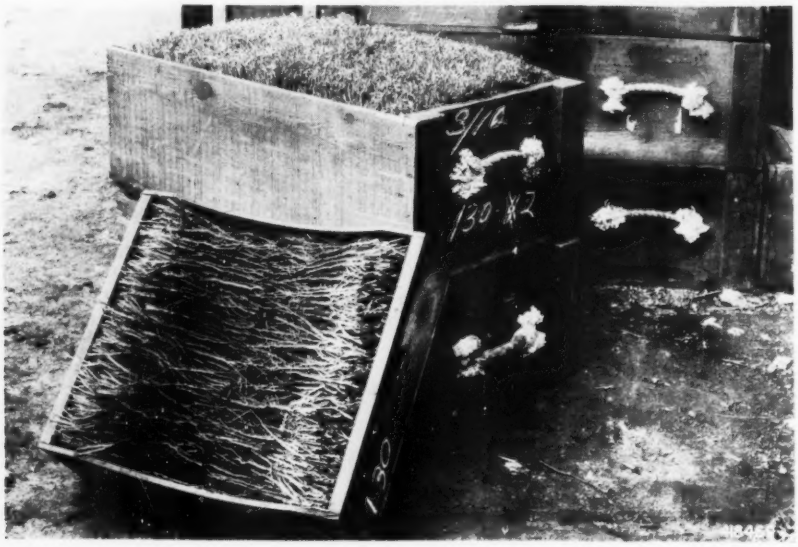


A closer view of the combination seeding and sanding machine. It is necessary to cover the light guayule seed with sand to keep it from blowing away before it takes root

Plant Industry and the Bureau of Agricultural Chemistry and Engineering.

Financed by advances from the President's Emergency Fund, later reimbursed from special appropriations, the Forest Service started work immediately. With personnel and equipment mobilized from its own far-flung organization and from that of other federal agencies, the work has been driving forward with unrelaxed speed and with impressive results. The ink with which the President signed the bill was hardly dry when 15,000 guayule seedlings from the Salinas nursery were field planted. By late

These seedlings are ready for lifting from the nursery preparatory to field planting, but first they are topped—again by machine



Here's how guayule seedlings look when lifted from the nursery and packed in boxes for quick shipment to the field planters. Over 400 millions of these seedlings will be field planted this fall

A guayule field plantation three months after planting. The picture shows how the transplanted shrub fills extensive fields. The real job of field planting begins this fall when plantations of nearly 50,000 acres will be established

April, twenty-six field plantations aggregating 870 acres had been established, and by late May, 22,000 pounds of guayule seed — acquired from the Intercontinental Rubber Company — had been sown on 530 acres of nursery seedbeds.

In June the foresters found themselves confronted with a "battle of weeds" which sprang up in the nursery beds. A small army of weeders — as many as 3,200 men and women on some days — was employed and the battle was finally won.

Then, beginning in late June and extending through July, came the harvesting of a seed crop from plantations previously started by the Intercontinental Rubber Company. Upon this crop depended a new supply of seed with which to expand the plantings not only in the Salinas region but elsewhere in the southwest, in Mexico, and possibly in other Latin American countries. The harvest (*Continuing on page* 380)

Cultivated guayule, four years old and ready for harvesting. Estimated yield is 1,200 to 1,500 pounds of rubber to the acre. This plantation was started by the Intercontinental Rubber Company. Its mature bushes have yielded a bumper 1942 seed crop

LIGHTNING OVER THE FOREST

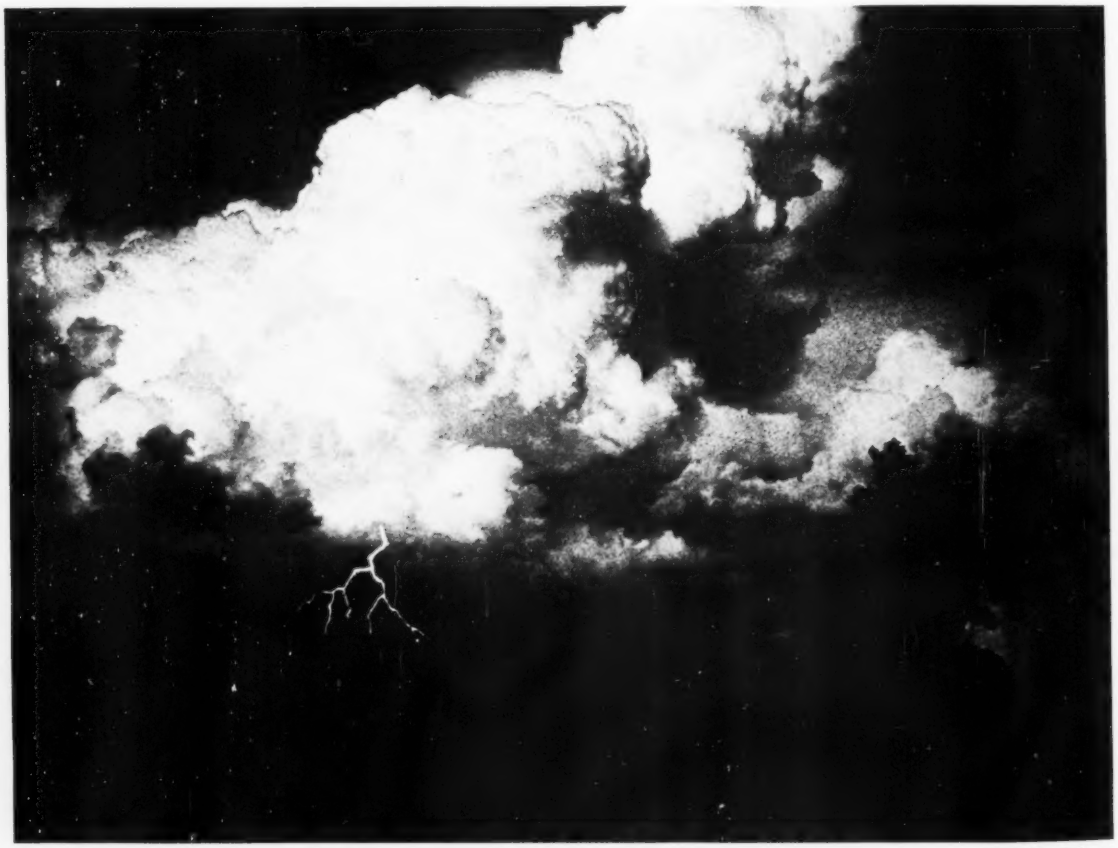
Upon the Ability of Experts to Forecast It Correctly Hangs Timber Needed for Victory

By EDWARD J. FENTON

SINCE Benjamin Franklin galloped his horse alongside a Maryland whirlwind to see how the thing worked, the science of meteorology has come a long way. Every year men learn more and more about what makes weather. They can't do anything about controlling it, but they can predict it.

Today the newest development of the Weather Bureau's forecasting service is gladdening the hearts of practical foresters—those men whose business it is to grow trees on the lands the loggers leave behind. For now the bureau has found out how to predict not only where and when thunderstorms will occur but at what altitude they will be when they start hurling shafts of lightning.

Lightning causes fires and fires are the forester's nightmare. Tree farmers know that nature will continue to reproduce trees if man can prevent the devastating fires which annually ruin forest areas totalling



Ewing Galloway

Lightning has long been the great menace to many western forests, causing in some regions eighty per cent of all fires. Today, when every tree is needed to win the war, government forecasters can predict not only when and where but at what elevation fire-setting lightning will strike

A sounding balloon being sent aloft equipped with "radiosonde." This amazing robot weather observer sends back signals which after being translated (below) give temperature, air pressure and humidity at varying heights reached by the balloon

U.S.D.A. Photograph by Haner

the size of Massachusetts. This new refinement to weather predictions will vastly increase the efficiency of forest fire-fighting and so comes as a boon to the men who are making increasingly successful efforts to raise trees as a crop.

Until recently, the Weather Bureau could forecast only that certain general areas would suffer from a thunderstorm. It might warn that the area in which Mount Shasta is situated is due for a storm. Fire-fighters would go to Mount Shasta and wait for an electrical accident to happen. But when it started they might often find that they'd have to scramble several miles up or down hill to reach a given fire. That was tough on the fighters' clothes and tempers and tougher on the forest. Because, to be confined, a fire should be reached a short time—in minutes if possible—after it starts.

But now the Weather Bureau can tell what *elevations* of the storm-swept area are most likely to be hit by lightning bolts during a given predicted storm. If you don't know anything about fighting forest fires that may seem like a small accomplishment. But any seasoned fire-fighter will tell you that the hardest task in fighting forest blazes is in getting to the scene with equipment. So important is this that the United States Forest Service employs parachute jumpers as one means of reaching a fire front quickly. Moreover, most timber land is in hilly country and mountains don't have elevators. There's a further reason why the Weather Bureau's development is of top value right now. This summer has the potentialities of being one of the worst forest fire summers in the West and Northwest for years, an unfortunate circumstance at a time when full manpower and all resources are needed to prosecute the war. The dire outlook for the summer months is the result of unusually heavy rainfall last autumn which prevented the regular burning of slash—the debris from logging operations. Much of that slash still lies on the ground, drying and rotting, strewn over the forest-like tinder.

Already forest operators and civil authorities in the West are organizing volunteer fire brigades to meet the expected menace.

In supplying these volunteers with information, the Weather Bureau's fire service acts as the intelligence branch of an army. It finds out where and when thunderstorms may be expected, how strong the attack will be. Then, through a highly developed communication system, it sends warnings to the fire fighters.

An attempt to explain how the service works is to venture into a field of science full of variables. Weather prediction is an uncertain business. The rules are always being changed as one person after another comes up with a new theory. In the popular mind, a weather forecaster is a gray-bearded mixture of pedant and witch-doctor. Actually Washington's weather men are rugged young fellows with Phi Beta Kappa keys and a refreshing ability to absorb new ideas.

Robert W. Craig is one of these gentry and it is he who explained how they chart the lightning. It's an old story to him to put things into layman's language; he put in a year at the San Francisco World's Fair, delivering what were described as "one-minute lectures" on the weather, which is like giving a one-minute course on the practice of medicine. To understand what makes a thunderstorm, Craig says, you must first rid yourself of the popular belief that hot air tends to rise. It doesn't; it gets pushed up. Under normal conditions, the air close to the ground is heated by the sun's summer rays. The air above is colder. Hence it is also denser—and heavier. But the warm air has weight too. Like every other kind of matter, it is attracted by gravity. So, since it had the position near the ground first, it tends to stay there, the heavier cold air above it like a blanket.

"It's like oil and water," Craig explains. "Oil is lighter and will float. But if you pour oil into a tube, then fill the tube with water, the oil will stay on the bottom. Unless you create turbulence, there is no way for the water to push the lighter oil to the top."

Now this condition of "turbulence" is practically always present on hot summer days that breed storms. A gentle wind may shove against the levels of warm and cold air, setting them in uneasy motion. At last the cold air breaks down through the agitated warm air and shoves it upward.

"It's just as if you shook the tube of oil and water," Craig says. "Eventually, the heavier water will break through the oil and drive it to the top."

All right, hold fast now. Or have you already fallen off the sled? When driven upward, the warm air tends to follow a narrow path, called a convection current or, more descriptively, a "chimney." Your cloud is built up on top of this chimney.

Scientists disagree on exactly what causes lightning. Most prevalent belief is that the falling raindrops are smashed against the up-rushing current, then reassembled, thus in some mysterious fashion separating the positive and negative ions. But however it's caused, thunderclouds discharge lightning and that's what's important to this story. All we must know is what makes thunderclouds.

The thing that was most difficult for this particular layman to understand was how the warm air cooled sufficiently during its passage aloft to condense the moisture it contains. Craig says the warm air mass passes through the cold air so fast that its temperature is not appreciably affected. What does cool it off is expansion. There's probably nothing harder to visualize than a cubic foot of air. But try it; pick out a favorite chunk of air near the ground. It goes up through the chimney and as it does there's naturally less and less pressure upon it from higher air strata. So it expands.

That's a law of physics: pressure increases heat. You've seen it yourself in pumping up auto tires. It follows then, that when you decrease pressure and so cause expansion you also decrease the heat content.

The hotter your piece of air is to start with, the higher it has to go to reach the condensation stage. When that happens, it becomes a cloud. The air vapor has formed into small particles of water. Cool it some more, and the particles form in bigger drops which fall as rain.

So the Fire Weather Service determines the possibility of a thunderstorm by knowing the difference in temperature of the various levels of air. It figures the probable height of the thundercloud base by knowing the temperature and relative humidity of the surface air, the factors which govern the height to which it will be sent before condensing.

Weather observers obtain this data by sounding the atmosphere. Every day, they send aloft balloons equipped with "radiosonde," an amazing, two-pound device which radios back to the observers the temperature, humidity and pressure at various levels. Putting all this data together, the bureau experts have a temperature map of the skies. It's a three-dimensional map, depicting the weather scene vertically as well as horizontally.

What does all this have (*Continuing on page* 384)

Association Passes 1942 Annual Meeting

For the first time since World War I, The American Forestry Association this year is foregoing the holding of an annual meeting. This action has been taken by the Board of Directors in the interest of helping to meet the wartime transportation problem. It is in line with the recent appeal of Joseph B. Eastman, Director of Defense Transportation, that the American people voluntarily restrict their travel and defer the holding of meetings and conventions not directly related to furtherance of the war effort.

WARTIME FOREST FIRE PREVENTION CAMPAIGN LAUNCHED

A MAJOR drive to aid the war effort by reducing materially the 90,000 to 170,000 forest fires caused annually by human carelessness was launched from Washington, D. C., on July 24. Known as the Wartime Forest Fire Prevention Campaign, the project was planned by the National Advertising Council as a contribution to the nation's war effort, and is being directed by the United States Forest Service in cooperation with public and private agencies throughout the nation. The opening gun was fired by Secretary of Agriculture Claude R. Wickard who presented to the country over a nationwide radio hookup the campaign's theme, or slogan — CARELESS MATCHES AID THE AXIS—PREVENT FOREST FIRES.

Practically every medium known to modern advertising and promotion is being employed in the campaign. Newspaper and magazine editors are being asked to cooperate to the fullest; feature, cartoon and comic strip syndicates are being enlisted; the radio is being employed on both national and local scale.

Motion picture producers, newsreel companies, along with the Motion Picture Committee for National Defense, are being asked to take part in this drive against careless matches and other thoughtless acts responsible for thousands of forest fires annually. Outdoor advertising companies, transportation companies, and all branches of the forest and recreational industries are being urged to cooperate. Women's clubs and the various service clubs are doing their part with other groups, both public and private.

For these mediums the Forest Service has provided millions of copies of printed matter designed by the talent pool of the National Advertising Council. Twelve million fire prevention stuffers, suitable for use in pay envelopes and all kinds of mailing matter, have been prepared; 2,000,000 leaflets showing how to put out a match and cigarette are being distributed, as are 2,000,000 cards on which are printed common-sense rules of forest fire prevention. In addition, 20,000 cards for street cars and busses, along with 15,000 billboard displays, are ready to go into action against fire during the vital days ahead. All of this material is in two colors, and displays the symbol and slogan of the campaign—CARELESS MATCHES AID THE AXIS—PREVENT FOREST FIRES.

Two interesting features of the campaign will be broad publicity given forest fire prevention by Paramount Pictures, Inc., in connection with its forthcoming production, "The Forest Ranger," and a fag-bag campaign to be conducted by the Girl Scouts of America. Fag-bags, devised and used by the Forest Service in California, are small cloth bags in which smokers entering forest areas are encouraged to keep cigarettes and matches. On each bag is printed a reminder that is flashed to the attention of the smoker every time he reaches for a cigarette, that CARELESS MATCHES AID THE AXIS.

Although the campaign is nation-wide in scope, its intensity will vary with critical regional fire seasons. During July, August and September the critical regions are all forest areas west of the Mississippi River. Beginning early in September, the southern, Gulf, and Great Lake states enter the critical period, and from mid-October the forest fire season is dangerous in the New England, northeastern and central Atlantic states.

To participate in this Wartime Forest Fire Prevention Campaign—and every citizen is encouraged to do so—get in touch with R. F. Hammatt, campaign director, U. S. Forest Service, Washington, D. C., or your state forester or local service clubs.

ALASKAN SPRUCE FOR

In the Tongass National Forest, Alaska, to which the Government is turning to speed up the production of Sitka spruce for airplane construction. Forest officers are here measuring a veteran spruce, whose clear, straight-grained wood will meet the exacting demands of the airplane makers

UPON Alaska, land of forest-lined waterways and islands banked against lofty mountains, the eyes of the nation more and more are being fixed. For here is our nearest fighting front. And here too is a vast region of natural resources, many of which are destined to play an increasingly important part in the war around the world.

Not the least of these resources is timber, the best of which is in the Tongass National Forest, owned by the people of the United States. To this Forest, the Government soon will be sending crews of husky woodsmen to glean from the wooded shores of sinuous fiords choice specimens of Sitka spruce, a wood urgently needed to speed forward our program of airplane construction.

As reported last month, the United States Forest Service has been assigned the job of logging ten million feet of spruce a month in the Tongass Forest and towing it in huge rafts a thousand miles down the coast to sawmills on Puget Sound. That is a long reach for timber, but the Sitka spruce grows only along the coast from California northward and the supply in Oregon and Washing-

A land of fiords and mountains, the Tongass National Forest is untouched by the rubber shortage because the principal means of travel is by boats. The man seen in the picture is a ranger landing to "scout out" the timber possibilities

NATIONAL DEFENSE

ton is proving inadequate to meet the growing war needs. Sawmills in Alaska are few and small and there is neither time nor equipment with which to build large ones capable of handling the great spruce logs that yield the clear, straight-grained lumber that the airplane makers demand.

The Tongass National Forest is the nation's largest publicly owned forest. It embraces more than 16,000,000 acres and stretches from about fifty miles south of Ketchikan to some seventy miles north of Juneau and inland from the outermost islands a hundred miles or more. Its forests are estimated at seventy-eight billion feet, about one-fourth of which is Sitka spruce. The other commercial species are western hemlock, red and Alaska cedar.

The spruce operations soon to start will be in the southwestern part of the forest, tributary to Ketchikan. Forest Service men are now active, endeavoring to engage logging and towage contractors. By the time this issue of the magazine comes from the press, crews of lumberjacks may be on their way northward to help "keep 'em flying" in ever-increasing numbers.

Here's how the Forest Service handles its field work in the Tongass National Forest. The house boat or "wanigan" is used by the crew as its home and is towed from place to place along the shoreline by one or more motor boats which also act as tenders to keep the men supplied with food

An inlet log pond showing logs assembled for sawing into lumber for local use. The large logs to be selected for airplane material, however, will be towed in huge rafts to mills a thousand miles distant on Puget Sound

The chickaree or pine squirrel interrupted at his breakfast,—a foot-long sugar pine cone

ON THE TRAIL OF SIERRA WILDLIFE

By LLOYD G. INGLES

Photographs by the Author

WITH dust rising from the feet of our three burrows, we started from Cedar Grove, California, on August 2 and headed up the trail toward that part of the snow-ribbed Sierra which marks the eastern boundary of the new Kings Canyon National Park.

We had been camping and conditioning ourselves for six weeks while waiting for the snow to melt on the high passes and for the myriads of mosquitoes to disappear from the wet mountain meadows. Now at last we were on our way "back." The purpose of our trip was to study and photograph as much of Sierra wildlife as the short summer season in the high country would permit. Among the hundreds of granite peaks far ahead of us were amphibians, reptiles, birds and mammals we had never seen, but hoped to find and add to our collection of pictures representing California's interesting vertebrate fauna.

To me, as to my wife, Elizabeth, this was a different kind of camping trip. Never before had we used burros to carry our load; never had we been obliged to eat only concentrated foods and trout; and never had we camped for days at a time at an altitude exceeding 10,000 feet.

In spite of the thrills that accompany the start of a new experience, we were uncomfortably hot as we settled into the two-miles-an-hour gait of our burros. Slowly we moved over the level floor of the Kings Canyon, the deepest river-cut canyon on this continent. Sometimes we were winding among granite boulders as large as houses over which towered giant yellow pines and firs. Sometimes the incense cedars grew so luxuriantly that the trail became a dark, damp tunnel. But always far above were the sheer, precipitous cliffs of the canyon.

At times we passed dry, open places in the forest over which many beautifully marked lizards streaked away to safety. One of these was a young western skink which we photographed at close range as it sunned itself on a large rock. Young skinks have yellow longitudinal stripes running down the body and a vivid blue tail, both of which disappear as the animals grow older.

We saw but two snakes during our high Sierra

trip. One of these was a large Boyle king on the floor of Kings Canyon. This reptile is one of the valuable snakes in the west because it occasionally kills and eats rattlesnakes, a disputed fact which the author demonstrated once by placing the two together in the same pen until the rattler was swallowed by the king.

The other was a large Pacific rattlesnake which Elizabeth killed at a surprisingly high elevation near the John Muir Trail. The trail here, however, ran along the warm south-facing slope and the entire mountainside was covered with chaparral which normally grows at a much lower elevation. She debated whether to kill the reptile, for it was an integral part of the fauna of the national park and had its place in the inter-relations with other animals of the region. She decided to eliminate it, however, since its proximity on the trail would endanger others who might be following.

As we were resting one noon in Paradise Valley we pulled an old decaying log apart to see if anything of interest could be found. Near its moist center was a beautifully marked tiger salamander. The animal moved very slowly and photographing it was easy.

In the dry, chaparral-covered foothills 3,000 feet lower were many other animals we hoped to try for after our high country trip was over. However, in these varied habitats through which we were passing were many familiar birds and mammals that had already been shot with our cameras.

In the cedars were blue-fronted jays raucously calling and scolding as we moved through their domain. In the sunny open spaces Beechey ground squirrels scampered to safety. In a little grove of black oaks three graceful long-tailed California gray squirrels chased and sported about, unmindful of us even when we stopped for a closer look.

The most ubiquitous mammal in the woods, however, was the Douglas chickaree or pine squirrel. If this little fellow was not jumping across the trail just ahead of the lead burro he would be barking at us from an overhead branch. In the trees he is extremely agile, running up, around, or down the trunk and branches with the greatest of ease.

The pine squirrel has one habit which gave us considerable concern while we were camped at Cedar Grove. At this time of year these little squirrels begin to fell the green cones of various conifers. They do this by gnawing and twisting the cone loose from the branches high above the ground. Inadvertently, we had camped for the night beneath a large sugar pine and about daybreak there was a crash in the branches above us and a heavy thud only a few feet from our sleeping bags. In the early light I could see the bright green three-pound cone, fully a foot long, lying a short distance away. Realizing at last what was happening, we lost little time in getting out from under the big tree. Six more cones fell while we were at breakfast.

We knew the chickaree would soon be down to husk this harvest for the little red nuts that lie beneath each of the cone scales. In anticipation, we gathered and hid all but one of the cones. This we placed before the camera in the best light we could find, and in less than a half hour the shutter had clicked on the chickaree just a fraction of a second before it scampered up the tree noisily cursing us for our interference.

Early one morning as we were climbing out of Kings Canyon into Paradise Valley a hollow "Boom! Boom! Boom!" came to our ears. The sounds were repeated every few minutes and were remarkably ventriloquial; one could go to the place from which the booming seemed to be coming only to find it issuing from somewhere else. After several minutes we located the source of the calls—a large male Sierra grouse, walking slowly along a limb about forty feet up in a lodgepole pine. Occasionally the bird would stop to eat the tender buds, after which

"Boom! Boom! Boom!" Strutting like a turkey, the Sierra grouse issues his strange mating call

Half the size of a house mouse, the shrew eats amounts equal to its own weight each day

With a loud whistling chirp, the Sierra marmot sounds the alarm of the high country

it would inflate the large yellow sacks on the sides of its neck, and, drawing its head close to its body, give the strange mating calls.

While we watched the bird go through its antics, it suddenly set its wings and sailed down to a manzanita bush not far away. Here we saw for the first time a hen grouse standing in the shadow. We approached to within ten feet with the camera without perceptibly alarming either bird.

The male was a gorgeous fellow with a brilliant orange stripe over each eye and the big golden bags on the sides of his neck. He strutted about with his wings cutting into the earth in the same manner a turkey gobbler behaves before its mate. Occasionally, with tail spread and wings dragging, he would circle about the female, then, turning suddenly, would run straight toward his mate, uttering his "Boom!" in front of her. This was repeated over and over, but not once did the female pay the slightest attention to him. We photographed the whole performance.

Although we saw several California mule deer along the trail, these animals were more timid and harder to approach than they were about the populous camps in Sequoia or Yosemite. One day a short distance from the trail I almost stepped on a very young fawn. It appeared to be too weak to support itself on its long legs. Young fawns are supposed to be scentless and therefore difficult for their enemies to find while they are so nearly helpless. We photographed the little fellow but kept a close lookout for the doe which, on such occasions, can be very dangerous with her sharp hoofs.

Bears are frequently a nuisance to the camper in the great national parks. In the back country, however, we rarely saw them. Near Paradise Valley we placed canned sardines on scattered rocks, hoping in this way to tempt a pine marten closer to our cameras. While we were watching the baits two yearling bears, one black and one brown, came ambling up wind. It was interesting to see how they

The Mt. Whitney pika, or cony, lives among the rock slides with their labyrinths of passages. Instead of hibernating, it builds "haystacks" of plants for the long, cold winters

found and ate all of the bait by following their superb noses. It is possible the two young bears were twins since the blacks and browns represent different color phases of the same species of black bear.

Our train led us daily into higher and higher country and into the domain of new kinds of trees and flowers. We made camp one evening about a mile up Woods Creek along the John Muir Trail. The government map showed the spot to be about 8,500 feet in elevation. The familiar yellow pine, sugar pine, Jeffery pine, incense cedar and Douglas fir were missing. Here along the course of the stream were lodgepole pines, and mixed among them was an occasional foxtail pine. Far up the great granite cliffs were giant Sierra junipers, with trunks and limbs twisted and torn by centuries of battle with the elements.

In this new kind of forest we found Clarke nutcrackers, white-crowned sparrows and red-breasted sapsuckers. There were many different kinds of mammals which were rarely seen below an elevation of 5,000 feet.

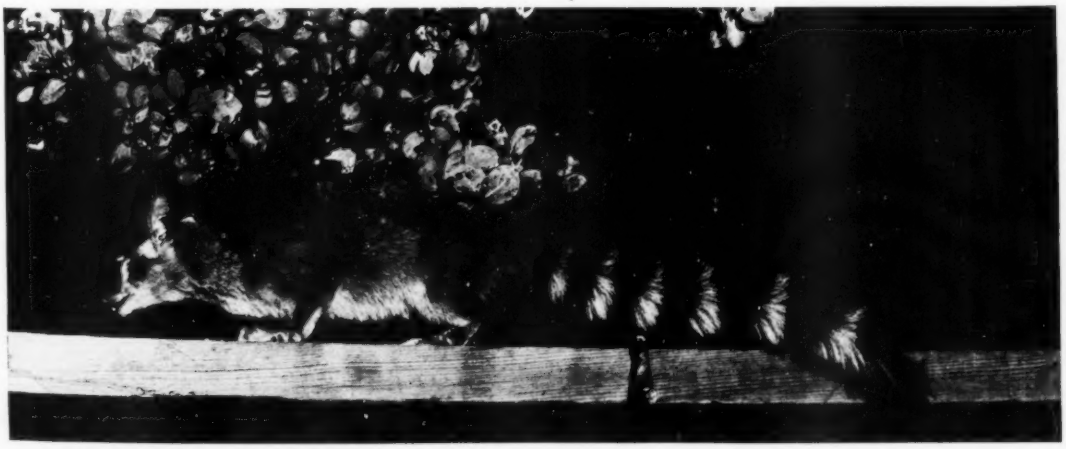
The golden-mantled ground squirrel and Tahoe chipmunk were most frequently seen among the trees. Besides being larger the ground squirrel could readily be distinguished from the chipmunk by the lack of light stripes on its golden head and shoulders. It was also rarely seen up in trees, whereas, the Tahoe chipmunk frequently is seen fifty or more feet above the ground. We had little difficulty in coaxing these squirrels to pose for their pictures. A little barley that had been left behind by a packer proved too tempting for them, and on occasion even brought both to the camera at the same time.

We camped for several days at Woods Lake,—10,860 feet elevation. It was here we studied an unidentified shrew, the Mt. Whitney pika, the southern Sierra Nevada marmot, and the short-tailed weasel.

One rainy day as we sat (*Continuing on page* 368)

The short-tailed weasel is a hunter extraordinary. Here one brings in a large white-footed mouse

This gray fox refused to be bluffed away by a striped skunk—but it's risky business



In the wilds among other animals the ring-tailed cat is very timid. However, near civilization they frequently take up residence in an occupied house — preferably in the attic

The 13,730-foot summit of rugged Fremont Peak, conquered 100 years ago this August

THE CONQUEST OF FREMONT PEAK

By REYNOLD E. CARLSON

Photographs by the Author

IN the rugged Wind River Mountains of Wyoming, Fremont Peak pushes upward 13,730 feet into the thin air of the Rockies. Exactly one hundred years ago, in August 1842, the first ascent of this lofty mountain was made by that historic government exploring party headed by John Charles Fremont.

Then a young lieutenant, Fremont had been sent by Congress to explore and map the route to South Pass, that great break in the Continental Divide through which were then trickling traders, trappers and a few immigrant parties on their way to Oregon and California. Though he had never before been west of the Mississippi River, the twenty-nine-year-old officer took to his task with great enthusiasm, becoming a keen observer and a tireless recorder of the things he observed. So accurate and in such detail were his recordings that it was possible later for others to retrace his steps, even to locate his campgrounds. Because of this precision, the West is today dotted with buttes, creeks and camps named in his honor.

Fremont had another superb faculty. He could make a government report sparkle with life and zest. Some of the passages from his journal are classics in travel writing. This is particularly true of his description of his now famous ascent of the great peak that bears his name. Though published as a government report, it was written with all the enthusiasm of a young man captured by the romance of the West.

Guiding Fremont was Kit Carson, the famous scout, who seems to have been somewhat scornful of the young lieutenant. This was probably because he was new in the ways of the West; but there is also evidence that Fremont was headstrong and often unwilling to listen to advice. As a result, Carson apparently determined to let the youthful officer learn the hard way—particularly when it came to the conquest of mountain peaks. Carson certainly knew the difficulties of mountain climbing, but Fremont's journal gives every evidence that all decisions were made by one completely unfamiliar with the problem. No experienced person like Carson could have been so easily fooled by distances and aspects of geography.

On August 7, 1842, Fremont and his party were

One Hundred Years Ago This Month, John Charles Fremont, Trail Blazing for the Pioneers, Made the First Ascent of This Lofty Wyoming Mountain

encamped in the Meadows of the Sweetwater, only a few miles from South Pass. He had now accomplished the objectives of his journey, and his orders were to return east. But for several days he had wistfully watched a majestic range of mountains rising to the north. After months in the dry plains, these mountains gave promise of green trees, clear water and cool days. One peak in particular, which seemed to rise higher than the others, enticed him. He could not resist the idea of its conquest, the temptation to attempt its ascent. To the inexperienced young officer this seemed a relatively simple task which would cost him only a few days before the start of the long journey back to the Mississippi. So the decision was made, and the following day the party crossed the divide and headed north.

When he reached the base of the mountains on August 10, Fremont made this entry in his journal:

"The air at sunrise is clear and pure and the morning extremely cold, but beautiful. A lofty snow peak of the mountain is glittering in the first rays of the sun, which has not yet reached us. The long mountain wall to the east, rising 2,000 feet abruptly from the plain . . . . is still dark and cuts clear against the glowing sky. A fog just risen from the river lies along the base of the mountain—the scenery becomes hourly more interesting and grand. . . . The sun has just shot over the wall making a magical change. The whole valley is glowing and bright; all the mountain peaks are gleaming like silver. Though these mountains are not the Alps, they have their own character, grandeur and magnificence, and will doubtless find pens and pencils to do them justice. In the scene before us, we feel how much wood improves a view. The pines on the mountain seem to give it much additional beauty.

"Winding our way up a long ravine, we came unexpectedly in view of a most beautiful lake set like a gem in the mountains. The sheet of water lay transversely across the direction we had been pursuing; and descending the steep, rocky ridge, where it was necessary to lead our horses, we followed its

Just to the right of the cascade on the far shore of Island Lake, Fremont established camp for his ascent of the great peak, shown in background, which now bears his name

bank to the southern extremity. Here a view of utmost magnificence and grandeur burst upon our eyes. With nothing between us and their feet to lessen the effect of the whole height, a grand bed of snow-capped mountains rose before us, pile on pile, glowing in the bright light of an autumn day. Immediately below them lay the lake, between two ridges, covered with dark pines, which swept down from the main chain to the spot where we stood. Here where the lake glittered in the open sunlight, its banks of yellow sand and the light foliage of aspen groves contrasted well with the gloomy pines. Never before in this country or in Europe have I seen such magnificent grand rocks."

At this lake (probably what is now known as Boulder Lake), Fremont decided to leave most of his equipment and men and make a hurried attempt to climb the peak. Fourteen men, in addition to Fremont, taking the best mules in the party to ride and one extra pack animal, left this camp on the morning of August 12. All day they traveled across ridges and thence up a steep defile. Night was spent beside a small lake.

The next morning the party proceeded about three miles farther up the defile, where they reached the source of the stream they had followed. Here Fremont decided to proceed on foot. "The peak appeared so near, that there was no doubt of our returning before night; and a few men were left in charge of the mules and provisions."

An early dinner was eaten, and the foot party set out expecting to reach the summit and return by nighfall. Fremont, who had had no experience in the western mountains, was completely deceived as to the distance and difficulties involved. The clear mountain air made the peak seem near at hand. Carson, who was one of the foot party, must have been aware of Fremont's error in judgment; but very probably Carson was not listened to, and the old guide decided to let Fremont learn from bitter experience. There is no other way of accounting for this attempt to scale a high mountain peak in an afternoon.

Anyone who can remember his first attempts at mountain climbing will recognize in the following account of Fremont the attitude of a rank amateur:

"We clambered on, always expecting with every ridge that we crossed, to reach the foot of the peaks and always disappointed, until about four o'clock, when pretty well worn out, we reached the shore of a little lake, in which was a rocky island. We remained here a short time to rest, continued around the lake, which had in some places a beach of white sand, and in others was bound with rocks, over which the way was difficult and dangerous, as water from innumerable springs made their way slippery.

"By the time we reached the far side of the lake we found ourselves all exceedingly fatigued, and much to the satisfaction of the whole party we encamped. The spot we had chosen was a broad flat rock, in some measure protected from the wind by the surrounding crags, and the trunks of fallen pines afforded us bright fires. Nearby was a foaming torrent which tumbled into the little lake about one hundred and fifty feet below us, and which by way of distinction we called Island Lake. We had reached the limit of the piny region; as, above this point, no tree was to be seen, and patches of snow lay everywhere."

A blanketless night was spent at the Island Lake Camp. In the morning the breakfastless men made their attempt on the peak that rose above them. A ridge seemed to offer the best line of approach, but its uneven character soon exhausted them. Instead of staying together the group spread out, each man seeking his own route to the top. Carson reached the crest of the main ridge just to the south of the peak but was unable to proceed from there to the summit. The high altitude and the great physical exertion soon exhausted most of the party, and several became sick. Fremont was forced to give up and retrace his steps to Island Lake. Here he was surprised to find that mules had been brought up from the lower camp with food and blankets. He therefore decided to spend another night at the Island Lake Camp and make another attempt.

The next morning, August 15, Fremont proceeded up a glacial valley west of the peak and made the ascent to the summit without great difficulty. "I sprang upon the summit and another step would have precipitated me into an immense snowfield 500 feet below." He had at last achieved his goal: the summit of the peak he believed to be the highest in the Rockies. For days he had seen the cool, snowy summits from the parched plains below; and now spread out before him was the great panorama of mountains and, to the east, the plains over which he had made his laborious way. He lingered for several hours on the summit and recorded his observations in his journal. The slightest details did not escape him. A bee lighted on his knee, and he wrote that this was probably the highest elevation at which a bee had been recorded.

Alone he descended the mountain and rejoined his men for the return to Boulder Lake, and thence back across the plains to make his report.

Today this peak bears Fremont's name. In a little iron box at the summit is a picture of Fremont and a record book in which are inscribed the names of those who climb the peak. Only from four to ten people each summer make the ascent, although this is one of the most frequently climbed peaks of the vicinity. Last summer, with Fremont's report in my hand, my wife and I ventured forth on a pack trip into the Wind River Mountains over the same country traversed by the young lieutenant nearly one hundred years earlier.

We left road's end near Pinedale, Wyoming, with two saddle horses and one pack animal. We hoped to find some of Fremont's campsites, to fish in seldom-fished lakes and streams, and to ascend Fremont Peak.

On the second day our horses carried us over a low pass. Below, nestled in a basin of rocky granite, lay Island Lake. Near the (*Continuing on page* 384)

EDITORIAL

Great things are done
When men and mountains meet
These are not done
By jostling in the street.
—William Blake

MEN AND MOUNTAINS PART

MEN and mountains met on that day in July, 1933, when the first camp of the Civilian Conservation Corps was established on the George Washington National Forest in Virginia. Great things were in the making. In the succeeding seven years, three million young men met the mountains, in manner of speaking, in every state of the union.

Lookout towers on mountain-tops; firebreaks on ridges; trails on slopes and roads in the valleys; denuded forest areas replanted; tree insects and diseases combatted; flood waters dammed; desert and swamp lands reclaimed; soils of farm and range conserved—these monumental things were done by the massed manpower of the Corps. More the Corps did. It met quickly and widely the needs of the time, the men and the job by providing during the depression for the social needs of unemployed youth.

The Corps has come now to an end. It has parted company with the mountains, on whose slopes and in whose valleys its deeds are written. Its complete demolition, we think, was premature and unwise because it was equipped to render a much needed war service.

Upon the President's declaration of a national emergency in 1940, The American Forestry Association emphasized the opinion that the Corps held within its organization all the potentials for a contribution to the war economy almost as great as its contribution to the peace economy. When the Japs struck at Pearl Harbor, that opinion became a conviction because it was at once apparent that our prosecution of war would be endangered by a high forest fire hazard from enemy saboteurs and that there would be a critical shortage of labor with which to meet the danger.

The Corps was a standing civilian army peculiarly prepared to help meet this war hazard. Its camps were, or could readily be, strategically located as centers of protective manpower; its manpower was experienced in forest fire fighting under the leadership of the federal and state forest protective agencies, its available equipment was ready for use. It was, in short, a standing, fully equipped, auxiliary force to strengthen forest protective agencies, faced with shortage of men, funds and equipment with which to meet a critical war emergency.

But no public and formal proposals came from the federal authorities for the use of the Corps as a forest protective force to the exclusion of any other duty. On the contrary, various and sundry other projects were advanced in an opportunistic effort to clothe the Corps with wartime importance. In the meanwhile, sentiment grew in Congress and in the public mind that the Corps should be demobilized. Its one outstanding need in the war effort became more and more confused and dimmed by bureau strategy and log-rolling. Deeply concerned, the Association laid the facts before Senator Charles L. McNary, in his capacity as a member of the Agricultural and Forestry Committee of the Senate.

The Senator made a forceful statement in the Chamber and introduced a section in the Second War Powers Bill which Congress accepted. As enacted on May 27, 1942, the amendment empowered the President to direct the Administrator of the Federal Security Agency to assign the manpower of the Corps to the extent necessary to protect forest resources, munitions, aircraft, and other war industries, municipal water supplies and utilities subjected to the hazards of forest fires.

It was presumed that federal and state officials concerned with forest protection would take immediate advantage of this authority and unite in a request to the President to issue an Executive Order without delay. The fire season already had started in some sections of the country. Men were leaving for employment in war industry or for induction in the armed forces. Nothing happened. Public officials remained silent in respect to the opportunity given by the McNary amendment.

On June 30 Congress directed the elimination of the CCC because it concluded that the conditions which led to its creation had been served. The conclusion was correct but there remained the vitally important job of protecting the war effort against the risks of forest fires. Here the Corps was by-passed and emphasis was placed on congressional appropriations with which to employ new men when, where and if they could be found.

The Corps was by-passed for lack of leadership in defining its essential war need and in developing a plan of integrating its manpower into the wartime job of forest protection. Had the Secretaries of Agriculture and Interior, the Administrator of Federal Security and Governors of imperilled states united in a demand upon the President and Congress that the Corps be streamlined as a wartime forest protective agency, favorable action, we believe, would unquestionably have followed. Instead, the emergency was left to bureau handling.

Carl Snyder, in his chapter on Economic Planning and Government Muddling in "Capitalism the Creator" quotes Publius Syrus, who said as long ago as 42 B.C., "amid a multitude of projects no plan is devised."

SLIPPERY ELM

Ulmus fulva, Michaux

BY G. H. COLLINGWOOD

SLIPPERY ELM has neither the graceful symmetry nor the large size of the more commonly known American elm. It is usually a tree of medium size averaging from forty to sixty feet in height with a comparatively short trunk one to two feet in diameter. Occasionally trees reach seventy or eighty feet in height and on especially favorable sites specimens 135 feet high with trunk diameters up to four feet have been found. The large, stout, spreading limbs branch haphazardly from the trunk, and form a broad, open, flat-topped crown that is often irregular in outline.

George J. Baetzhold

The flat, broadly-winged seeds occur in clusters along the twigs

Pennsylvania Dept. of Forests and Waters

Usually slender with short trunk, Slippery Elm has stout, spreading branches that form a broad, open crown

Of the six species of elm native to eastern North America, slippery elm is second to American elm in abundance, and has a natural range almost as extensive as the latter. It grows from Maine and the lower St. Lawrence valley in Canada, westward across southern Ontario to eastern South Dakota and southward to western Florida and eastern Texas.

Slippery elm prefers rich, moist, alluvial, well-drained soils, and is found most frequently along stream banks and on low, fertile, wooded slopes. Sometimes it grows on rocky ridges or limestone outcrops, but in such sites it makes poor growth. The region of greatest abundance and greatest size is probably in the Great Lakes states.

Bark on old trunks of slippery elm is frequently an inch thick, deeply furrowed into large, loose plates, and is ashy gray to dark, reddish brown in color. The inner bark is whitish and strongly mucilaginous. It is the latter quality which gives the tree its common name. Also aromatic, the inner bark is sometimes chewed to allay thirst; and because it has a soothing effect, it is used medicinally, for which purpose many trees are stripped of their bark and killed. In the North the tree is sometimes called moose elm because

F. W. Besley

George J. Baetzhold

The perfect, short-stemmed flowers appear in March or April before the leaves

moose eat both twigs and bark. Other common names are red elm, red-wooded elm, rock elm and Indian elm.

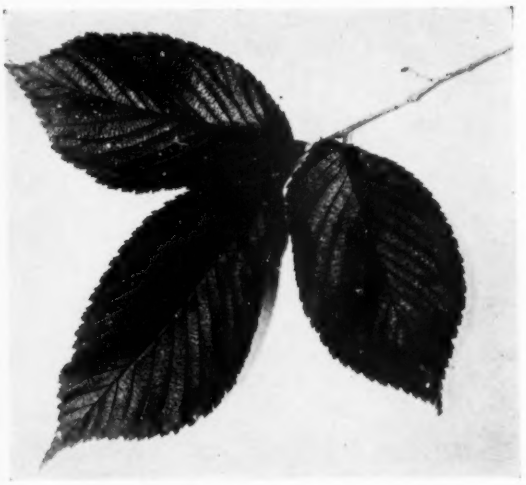
Hairy and roughened by pores and leaf scars, the twigs are at first pale gray or grayish brown, later becoming darker. They are stout, tending to turn upward, and have no buds at the tip.

The tawny hairs of winter buds offer a means of identifying slippery elm from the American elm, whose winter buds are smooth and account for the generic name *fulva*. Leaf buds are about a quarter inch long, located toward the outer ends, while the stouter, thicker flower buds are further back along the twig. Flowers appear in April or early May before the leaves and are in crowded clusters on short stalks.

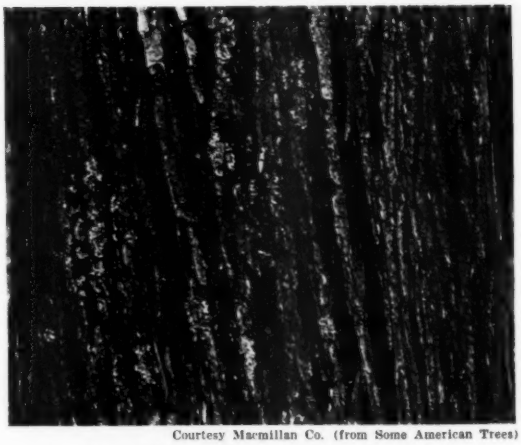
Another characteristic of slippery elm is the extreme roughness of the upper surface of its leaves. Growing alternately along the twigs, these leaves are covered with stiff hairs above, and are rough to the touch when rubbed in any direction. Firm, wrinkled and dark green above, paler beneath and coated with soft hairs, especially on the midrib, the leaves of slippery elm measure four to seven inches in length and two to three inches in width, and are doubly toothed on the margins, pointed at the tip, and rounded and uneven at the base.

Wood of slippery elm is hard, strong, compact, and durable in contact with the soil. A cubic foot weighs forty-three pounds when dry. Heartwood is reddish brown and the sapwood paler. Though slippery elm is not an important timber tree, its wood is used for furniture, wheel-hubs, fence posts, railroad ties, sills, ship-building and agricultural implements.

Like other elms of this continent it is susceptible to Dutch elm disease and *phloem necrosis*.

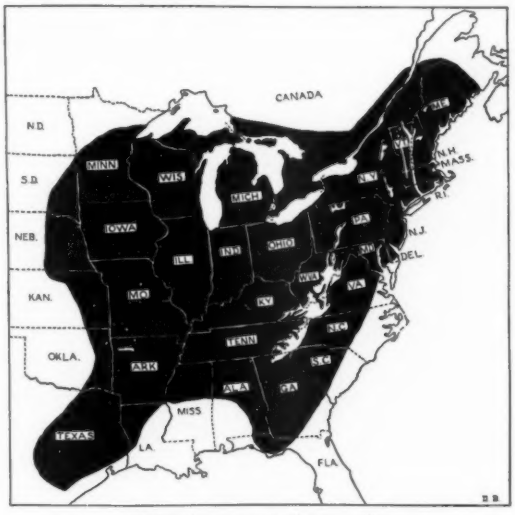


The alternate, wrinkled, thick leaves are coated on the upper surface with rough hairs



Courtesy Macmillan Co. (from Some American Trees)

The deeply furrowed bark has an under layer that is ruddy-brown and an inner layer that is mucilaginous and nearly white



Natural range of Slippery Elm

YOUR SHADE TREES: By P. P. PIRONE

SOIL IMPROVEMENT

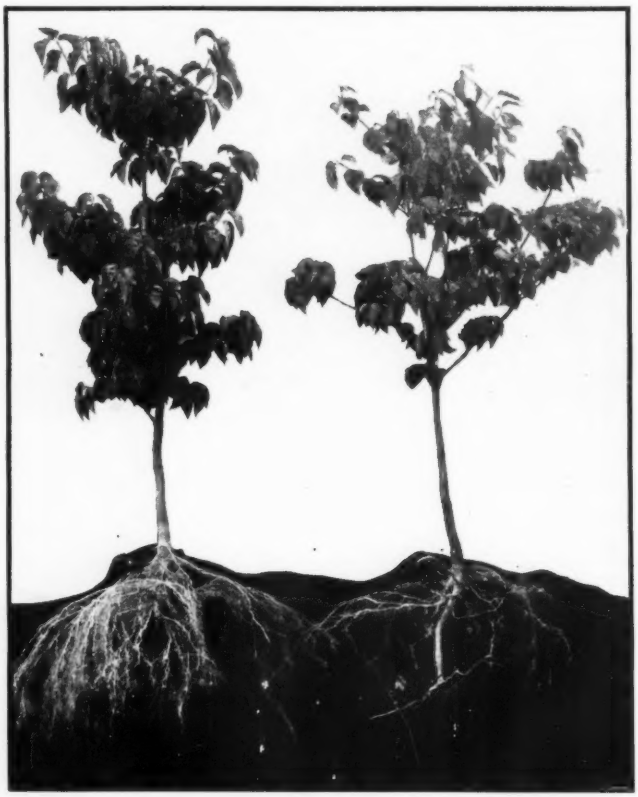
Because many abnormalities in trees are closely associated with plant-food deficiencies, most professional arborists recommend the incorporation of a complete chemical fertilizer in the soil as the first step toward a cure. But although such a practice often results in considerable improvement in the vigor of the tree, in many cases no favorable response is obtained. Assuming that the fertilizer has been placed properly, that is, in close proximity to the so-called feeding roots, failure to obtain the desired results may be due to the absence of several soil or environmental requisites that can easily be overlooked, and these requisites must be met before the tree can derive maximum benefits from chemical fertilizers.

Organic Matter Essential

A properly conditioned soil is above all necessary for successful tree maintenance. Of the several constituents of such a soil, organic matter is most likely to be deficient. Organic matter is essential for the maintenance of soil microorganisms, for in its decay, mineral nutrients and nitrogen for the use of the currently growing plants are released. Organic matter also serves to improve the physical condition of soils. When applied to light sandy soils, it tends to fill up the pore spaces between the particles, thus making the soils more compact, increasing the water-holding capacity, and decreasing the tendency to leaching and to the loss of plant nutrients. For best results on such soils, therefore, it should be worked well beneath the surface. In clay soils, organic matter tends to separate the fine clay particles so that water and air penetrate more freely and thus facilitate intake of plant nutrients by the roots. The addition of organic matter to clay soils also helps to reduce their hardness or crustiness during dry spells and makes them more workable. In such soils, therefore, it should be incorporated near the surface.

Use of Manure and Peats

Of the many sources of organic matter, those most commonly used for shade and ornamental trees are stable manure and two distinct types of peat — peat moss and sedge peat. Peat moss, also known as sphagnum peat or peat, is very acid in reaction and is used principally for acid-loving plants, such as hemlocks, pines, spruces, rhododendrons, and azaleas. It is fibrous in nature, light brown in color, low in nitrogen content, — around 1 per cent on a dry basis—and has a high water absorbing capacity. Sedge peat, also known as reed peat or humus, as offered for sale, is dark brown to black and higher in nitrogen content than peat moss. It is less acid in reaction and has a lower water-absorbing capacity than peat moss.



Proving how the addition of organic material to the soil invigorates trees—the young dogwood at the left was grown in soil to which peat was added a year earlier, while the one at the right, of the same age, was grown in soil without peat

As a rule, manure should be well rotted or at least past the stage of most rapid decay if it is to be placed at any considerable depth around established trees; otherwise, it may injure the roots. There are several shortcomings to the extensive use of manure as a source of organic matter. It is difficult to obtain, disagreeable to handle, and it usually harbors many weed seeds.

In contrast with manures, peats appear to decompose without the formation of harmful effects when mixed to considerable depths in well-aerated and well-drained soils. They are pleasant to handle and are free from weed seeds. The granulated form of peat moss can absorb as much as 2,000 per cent of its own volume in water, and releases the absorbed water gradually, thus making moisture available over a relatively long period. The

water-retention properties of peat moss are well illustrated by contrasting them with those of soil and sand. A good loamy soil is capable of holding about one-half of its own dry weight, while sand can absorb about twenty per cent. Peat moss, on the other hand, can absorb and hold more than twelve times its own dry weight. For this reason, it should never be applied in the form in which it is purchased, but must be thoroughly soaked beforehand.

Peats are primarily soil improvers. They should not be classed as fertilizers since their actual nutrient value is very low. The inclusion of peat or other organic matter in the soil, to the complete exclusion of a chemical fertilizer, consequently, is not desirable. The addition of such organic matter, however, will improve conditions and make the nutrients already present more available, and so smaller quantities of chemical fertilizers will be needed to produce the same beneficial effects. When large quantities of peat are used, some nitrogen in the form of nitrate salts should be applied from time to time throughout the following summer, to supply both the trees and the bacteria that decompose the peat. This practice will compensate for the leaching due to the frequent watering that is necessary for transplanted trees.

Peats should be added at the rate of fifty per cent by volume to the ordinary type of subsurface soil or twenty-five per cent by volume to topsoil. These are relatively large amounts to incorporate into the soil at any one time. Consequently it is best to build up the organic matter content in easy stages. Smaller amounts of peat can be incorporated in the soil around the trees over a period of several years.

Many horticultural practices commonly employed by arborists lend themselves ideally to the use of organic matter. For example, it may be put into the soil during cultivation around a tree; it may be placed in holes punched into the soil with a crowbar or made with a post hole digger; placed in specially-made trenches, and it may be applied as a mulch. In the last case, of course, there must be no sod beneath the trees.

Even the incorporation of liberal amounts of organic matter to soil will not help in all cases. Disappointing results may ensue, if the organic matter is added to very wet or extremely acid soils. Such adverse conditions must be rectified before much benefit from the organic matter can be expected. Wet soils, for instance, may be improved by the insertion of drain tiles to draw off the excess water. Shallow soils, likewise, will respond better to organic matter incorporations if any underlying hardpan or impervious subsoil is first broken up by the use of special digging tools, or even by blasting with dynamite.

A good way to increase the organic matter of tree soils is to fill the remainder of the holes around the tree, in which fertilizer was added, to nearly an inch from the ground level with peat. Then completely fill the hole with good top soil

Soil Reaction

Another important requisite of successful tree maintenance, the proper soil reaction, is more keenly appreciated by the arborist. Evidence of this is noted in the widespread use of soil-testing kits and in the thousands of soil samples submitted annually to state experimental station laboratories for testing. In general, most trees grow best on soils having a *slightly* acid reaction. A pH value between 5.5 and 7.0 is favorable for most trees. There are, of course, exceptions to this rule. For example, honey locust, London plane, Kentucky coffee tree, redbud, goldenrain tree, and poplar appear to grow best in a neutral or alkaline soil. At the other extreme, sweet birch, blackjack oak, southern red oak, and shrubs like rhododendrons and laurel prefer an extremely acid soil (pH 4.0 to 5.0).

Extreme ranges in reaction can be corrected by adding certain chemicals to the soil. Some form of lime is recommended to sweeten excessively acid soils, and the use of aluminum sulfate or sulfur is suggested for overcoming alkalinity in soils. The reaction of 1,000 square feet of a silt loam soil, for example, can be changed from a pH value of 5.0 to 6.5 to a depth of six inches by adding 124 pounds of ground limestone. Incidentally, besides sweetening the soil, this material markedly improves its physical condition. The acidity of 1,000 square feet of the same type of soil can be increased from pH 7.5 to 5.0 by the addition of sixty-five pounds of sulfur or 155 pounds of aluminum sulfate.

The importance of proper soil reaction is well illustrated in the author's experience with pin oaks several years ago. The leaves of several dozen pin oaks, planted along a city street twelve years previously, were distinctly yellow, and twig growth was poor for a long time. Employees of a large tree company attempted to correct the abnormal condition by inserting large amounts of the company's special fertilizer, but the trees failed to respond. Further investigation revealed that the oaks were growing in soil containing a considerable percentage of ashes and soil tests showed that the pH value varied from 6.8 to 7.2. The problem was simplified by this information, and the subsequent treatment was highly successful. Pin oaks are known to suffer from iron deficiency when planted in sweet soil. A complete cure was obtained within three months by inserting an iron salt into the trunk to supply the sorely needed element. Adding the same material as well as a soil acidifier (sulfur or aluminum sulfate) directly to the soil also helped to supply the deficient chemical as well as to adjust the soil reaction so that iron could be absorbed by the roots.

ON THE TRAIL OF SIERRA WILDLIFE

(*Continued from page* 359)

near our campfire our attention was attracted by a little shrew that came boldly out of the litter at the base of a willow clump. This species is about half the size of a house mouse. What it lacked in size, however, it made up in ferocity and boldness. Like the moles, which belong to the same zoological order, shrews are voracious and on occasion will eat their weight in food every day. This particular shrew had been filling its small stomach with fat from a discarded bacon rind. It was impossible to get it in good enough light to make a satisfactory photograph. We attempted catch the tiny creature but, in doing so, we fatally crippled it.

The big rock slides stretched from the lake up to the bases of the surrounding cliffs. These were the homes of marmots and pikas. The southern Sierra Nevada marmot is as large as a house cat and belongs in the squirrel family. Its habits in general resemble those of its eastern relative, the groundhog.

As one approaches a rock slide they scamper from the adjacent meadows as fast as their fat bodies allow, to climb up some projecting rock which serves them as a lookout. Once they are perched on such a place they survey the surrounding country for hours at a time. If a hawk or an eagle approaches a loud whistling chirp from each marmot spreads before the marauder and warns not only other marmots but pikas and smaller animals as well. Marmots are difficult to approach, and we found satisfactory pictures extremely hard to get.

In the same slides and often in very close proximity to the marmots were the pikas, or conys, as they are sometimes called. The pika belongs in the same zoological order with the rabbit and resembles this animal in its manner of hopping about. It also has a short tail. However, its round white-edged ears and its inclination to perch on a rock and bark "cha-cha" at all intruders are not at all rabbit-like.

Living as it does near or above timberline, the pika would be a delectable morsel for a marten or goshawk were it not for the enormous granite rock slides with their labyrinths of passages. Practically the only time the pika is vulnerable to its enemies is when it ventures a few feet away from the big granite rocks for its plant food. Unlike the marmot, which goes into hibernation when the cold Sierra winter approaches, the pika makes for itself a large "haystack" of choice plants.

The plant food used depends on the kinds that are available. Once in Glacier National Park we found pikas were making their "haystacks" with small alpine willows that were scarcely two inches tall; in the Sierra they were using the large lanceolate leaves of the Sierra shooting-star, which grows along wet places even far above timberline. Occasionally "haystacks" of grass were found. The food is cut while quite green, then it is cured by spreading it out in the sun. When thoroughly dry, it is stored under some large rock to await the long cold winter.

We found the pikas of the Sierra much more difficult to approach than those in the Rocky Mountains, hence our photographic efforts were more difficult. After settling with our cameras focused on a favorite perch, we would generally find the pika watching us from some other crevice or rocky promontory. It was only after a hungry pika had gone through a long, narrow "peninsula" of loose rock projecting away from the main slide that we were able to make any exposures at all.

While the animal was out in this narrow bit of talus we rapidly dug across it down to solid rock, thus cutting off its means of escape into the main rock slide. The pika became quite alarmed when it discovered its dilemma and, in attempting to escape, provided several excellent chances for pictures at close range. Its reflexes, however, were so rapid that only shutter speeds of one-one hundredth of a second or faster were successful.

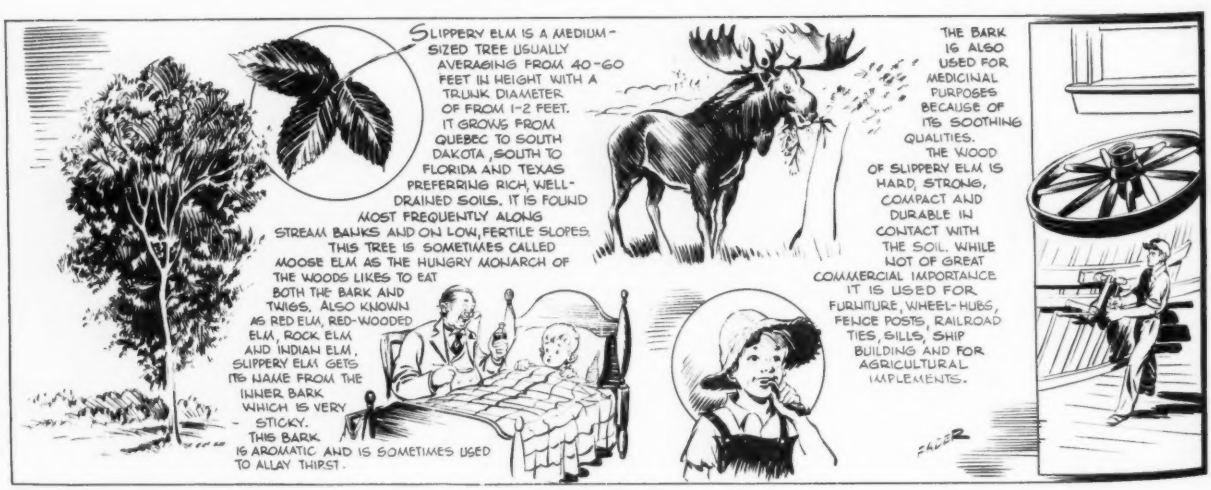
In many respects the most interesting animal we photographed during the entire summer was the short-tailed weasel. Certain species of weasels belonging to this group are the smallest true carnivores in North America and the habits of the Sierra species are little known. Hence, we were indeed happy when the excited chirpings of a pair of white-crowned sparrows led us directly to a den of these little predators under a foxtail pine on the south side of Woods Lake.

The old weasel seemed not much larger than the white-footed mice which it brought several times each day to its young. There were but two entrances to the den and since the weasel hunted during the day as well as at night it was not difficult to make some exposures as close as three feet from the bold little creature.

During the four days the nest was continually under observation we saw the old weasel return many times, but only once without a mouse. Juncos were feeding their young fledglings and alpine chip-

(*Continuing on page* 383)

TREES AND THEIR USES—No. 67—SLIPPERY ELM


SLIPPERY ELM IS A MEDIUM-SIZED TREE USUALLY AVERAGING FROM 40-60 FEET IN HEIGHT WITH A TRUNK DIAMETER OF FROM 1-2 FEET. IT GROWS FROM QUEBEC TO SOUTH DAKOTA, SOUTH TO FLORIDA AND TEXAS PREFERRING RICH, WELL-DRAINED SOILS. IT IS FOUND MOST FREQUENTLY ALONG STREAM BANKS AND ON LOW, FERTILE SLOPES. THIS TREE IS SOMETIMES CALLED MOOSE ELM AS THE HUNGRY MONARCH OF THE WOODS LIKES TO EAT BOTH THE BARK AND TWIGS. ALSO KNOWN AS RED ELM, RED-WOODED ELM, ROCK ELM AND INDIAN ELM, SLIPPERY ELM GETS ITS NAME FROM THE INNER BARK WHICH IS VERY STICKY. THIS BARK IS AROMATIC AND IS SOMETIMES USED TO ALLAY THIRST.
THE BARK IS ALSO USED FOR MEDICINAL PURPOSES BECAUSE OF ITS SOOTHING QUALITIES.
THE WOOD OF SLIPPERY ELM IS HARD, STRONG, COMPACT AND DURABLE IN CONTACT WITH THE SOIL. WHILE NOT OF GREAT COMMERCIAL IMPORTANCE IT IS USED FOR FURNITURE, WHEEL-HUBS, FENCE POSTS, RAILROAD TIES, SILLS, SHIP BUILDING AND FOR AGRICULTURAL IMPLEMENTS.
FAGER

Article of the Month

QUININE FROM THE "FEVER TREE"

By WILSON POPENOE

Beginning this month, AMERICAN FORESTS will present as a special feature the digest of an article which has appeared elsewhere and which, in the judgment of the editors, is of outstanding interest from the standpoint of the information it contains. QUININE FROM THE "FEVER TREE," by Wilson Popenoe, in charge of research for the United Fruit Company, has been selected for this month because of the new light it throws on the historical background of the Cinchona tree which, with the fall of Java to Japan, has assumed new importance to the Americas. The article is condensed from "Agriculture in the Americas" for March

In 1633, the good padre Calancha wrote from a Peruvian monastery: "In the country of Loja there is a tree which they call the 'fever-tree,' the bark of which, ground to powder and administered in the form of a potion, cures fevers; there have been marvelous examples of this in Lima." The marvels were destined to grow with passing centuries, for the padre's tree was the cinchona, source of the almost-magic drug, quinine.

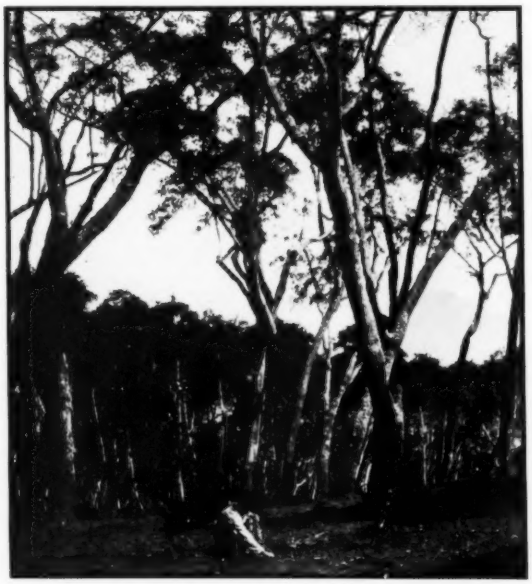
Today, quinine is one of the treasures of the Indies toward which, as this is written, Axis plunderers are driving their military machine. There is little production in the plant's native American home. Ninety per cent of the entire world supply is either grown in the Netherlands East Indies or distributed through Dutch interests. The Island of Java has long been the center of plantation production and after Amsterdam fell to the Nazis it became the processing headquarters, as well.

Quinine is ordinarily used in the form of quinine sulfate, one of several alkaloids that may be extracted from cinchona bark. It is the best known specific in combatting malaria. Yearly United States requirements for the drug appear to total between 3,000,000 and 4,000,000 ounces, used principally by sufferers from malaria and to a lesser extent in other medicines, in toiletries and for culinary and beverage purposes. With military needs likely to grow, it can be seen that quinine is a strategic material of great importance.

Fortunately, the Axis threat to the main source of so valuable a product has not found the country unprepared. Substantial reserve stocks are reported to have been built up in this country to meet the immediate emergency. Scientists are at work on synthetic substitutes. And, in several Latin American countries, excellent progress is reported in a program to reestablish the cinchona tree in its native American habitat.

The discovery of the medicinal virtues of cinchona bark ranks as one of the major events of South American colonization, and the story of how and when it occurred is a fascinating chapter in agricultural history, filled with confusion and contradiction that botanists have been trying to straighten out for three centuries.

The account which until recent years has generally been accepted as authentic was placed on record by Sir Clements Markham, the English savant who played a prominent part in the establishment of cinchona cultivation in the eastern tropics. According to this, an Indian of Loja, Ecuador, revealed the curative power of cinchona to the *corregidor* (magistrate) of that town, who in 1638 sent a package of the bark to Lima to the court physician, who supervised the health of the family of the Spanish Viceroy, the Count of Chinchón. The drug was administered to the Viceroy's wife, Doña Ana de Osorio, and cured her of malaria. She is credited with carrying the good news, as well as some of the bark, back to Spain.



Taken by Dr. Oswald Schreiner of the U. S. Department of Agriculture in 1930, this shows mature cinchona trees grown from seed brought from South America to Java. If they are still standing in the Cinchona Gardens, at Tjinjiroean, Java, they are now eighty years old

In recent years interested students have brought to light a version with a considerably different cast of characters. In 1938, the eminent Peruvian physician, Carlos Enrique Paz Soldán, published a little work entitled *Las Tercianas del Conde de Chinchón* (The Fevers of the Count of Chinchón), which not only alters the accepted tale considerably but it is in itself a literary gem.

According to Paz Soldán's version, the fourth Count of Chinchón arrived in Lima on January 14, 1629, to take up the

important duties of Viceroy. He was accompanied by his second wife, Doña Francisca Enríquez de Rivera. His first wife, Doña Ana de Osorio, who has erroneously been involved in the traditional story of quinine, had died in Spain sometime during the year 1625.

The *Diario de Lima,* a chronicle of daily events, which was kept by a priest named José Antonio Suardo during the time of the Count of Chinchón, shows conclusively that the Viceroy was attacked shortly after his arrival by tertian fevers which during subsequent years repeatedly incapacitated him for work. Following the best medical practice of the day, the court physician, Dr. Juan de Vega, applied the accepted treatments. The Viceroy was bled and he was purged; he was purged and he was bled. Still the attacks continued and at one time the patient was so low that he prepared himself for death. Through these years the *Diario* of Padre Suardo, meticulous in its attention to detail, makes no mention of any illness suffered by the Lady Francisca, consort of the Viceroy.

In 1638 the Viceroy was suddenly cured of his fevers. On December 18, 1639, he transferred the authority of his high office to his successor and prepared to leave for Spain. The voyage in those days was a long one, via Panama and Cartagena de Indias (now Cartagena, Colombia). On reaching this last-named port Doña Francisca was stricken with a fatal illness, and the Viceroy continued home accompanied only by his young son. On reaching Spain he retired to his hereditary estate near Madrid and died there at 68, a ripe old age for those days.

Attempting to harmonize the known facts, as brought to light mainly through the *Diario de Lima,* with the legendary tale of the discovery of the therapeutic value of cinchona bark, Paz Soldán argues with irrefutable logic that the Corregidor of Loja, who had learned the secret of quinine from the Indians, sent the precious bark to Lima to cure the Viceroy, not his consort. It was the latter, in fact, who administered the drug; the court physician clinging to the tenets of his profession, which did not permit the use of unknown remedies of the Indians.

Both versions of the tale are in agreement that the Indians knew the value of *quina quina,* as they called the bark, although there have been stories to the contrary. La Condamine, Jussieu, and Ruiz, early scientific travelers who visited the native home of the trees, all were of the opinion that the Indians gave the secret to the Spaniards. In view of the extensive plant knowledge possessed by the more advanced native races of America such as the Aztecs, the Mayas, and the Quichuas (of whom the Incas were the ruling clan), there is little reason to doubt that this was the case.

The drug subsequently came to be widely used in Spanish America under the name of *cascarilla,* and one of its greatest advocates was Dr. Juan de Vega, the Count of Chinchón's court physician, who became convinced of its value despite his apparent skepticism when the drug was first brought to his attention in Lima. Its use was also greatly popularized by the Compañía de Jesus (the Jesuits), who were particularly active in making quinine known in Europe.

One more unfortunate, if minor, incident marked cinchona's history. When the great Linnaeus came to include the plant in his published works, which formed the foundations of modern botany, he spelled the name *Cinchona* instead of *Chinchona,* an error which Sir Clements Markham later attempted unsuccessfully to rectify. Although the rules of botanical nomenclature prevent a return to the correct spelling, they do not preclude the pronunciation *chin-chó-na,* which is commonly used.

For two centuries the sole source of this valuable drug was the forests of the Andes from Colombia to Bolivia, in which the cinchona tree grows wild. Then, because of increasing scarcity of the bark and increasing appreciation of its immense medical value, the Dutch and British governments began to take an interest in establishing cinchona plantations in their Asiatic colonies. In 1852 plants grown from seeds collected by Weddell in Bolivia were sent to Java; in 1854 these were followed by others from seeds collected by Hasskarl. Then in 1859 the British government made extensive plans for growing cinchona in British India, plans which were entrusted for execution to Sir Clements Markham.

The story of the search for the best cinchona trees in the Andes, an arduous and dangerous task carried out by the naturalist Richard Spruce and others, forms a romantic chapter in the history of quinine, as the drug eventually came to be known from its Indian name. Ultimate success was achieved when Charles Ledger, an Englishman who had lived in Peru and Bolivia for twenty years, obtained seeds of a superior strain which were sent to Europe in 1865 and were found in Java to produce trees of much higher quinine content than any which had been grown previously.

From these seeds have come the trees which form the basis of the extensive plantations, more than 45,000 acres, which today supply most of the world's quinine. Ledger's memory is kept green through the use of his name for the trees which have come from his seeds, trees known as *Cinchona ledgeriana,* now considered botanically to be a form of *Cinchona officinalis.*

Most of the world's quinine is produced by the *calisaya* type of tree, native to southern Peru and Bolivia. *Ledgeriana,* or the Ledger form, is a type of *officinalis,* which latter is considered by some modern authorities to be the true botanical species—including the *Cinchona calisaya* of Weddell. Quite different in character is *Cinchona succirubra.* Its bark rarely yields more than two or three per cent of quinine, while that of good Ledger trees commonly averages seven per cent or higher. *Succirubra* is mainly employed today as stock plant on which to graft the less robust *Ledgeriana,* although the former is cultivated to a limited extent for the production of barks used in the form of "quills," narrow strips which roll up on drying, for pharmaceutical purposes and for the medication of wines.

Quinine production is not completely extinct in the Western Hemisphere. For some years there have been small commercial plantations of *calisaya* in the mountains of Bolivia, a country which in 1938 exported almost 2,000,000 pounds of cinchona bark to Europe. Plantings of *succirubra* were made many years ago and still exist (usually in a more or less abandoned state) in Ecuador, Colombia, Guatemala, and perhaps a few other countries. These sources, however, are at present far from sufficient to supply Western Hemisphere needs. That is why, as the world political situation has grown steadily more confused the last few years, the American governments and private American drug interests have fostered experimental work looking toward the development of quinine sources in those Latin American countries where conditions are favorable. These efforts have been concentrated on the plantation production of higher-yielding types of cinchona such as the Ledger. Guatemala has been the scene of the greatest activity, although experiments have also been started in Brazil, Venezuela, Colombia, Costa Rica, Mexico, and elsewhere.

Those concerned with cinchona culture in most of the countries mentioned have had to start from scratch. With the exception of a few vague memories of experiments conducted in Guatemala in the 1860's and of published information from Java, they knew little about the subject when they commenced work a few years ago. They did know that cinchona is not an easy tree to establish, since the varieties of high quinine content are extremely exacting in their requirements of climate and soil. They come from regions in the Andes where the mountainsides are covered with a thick layer of humus, the accumulated leaf-fall of centuries, and where clouds piling up from the lowlands keep the atmosphere moist a large part of the time. Successful establishment of commercial plantations thus depends upon utilizing areas which possess the proper conditions and upon growing kinds which are of relatively high quinine content.

WHAT A MAN NEEDS, HE TAKES

By J. ALFRED HALL

Life in the hills was not easy in the panic year of 1893. Indeed, it was never easy. Yields of the stony soil on the cleared slopes or the "crawfishy" flats along Young's Creek were grudgingly small. Yet, by hard work and good management, there was always plenty to eat. Mother knew the arts of canning and preserving. The smokehouse was filled with hams and shoulders and barrels of "pickled meat" in the fall. Mostly it was from pigs born and raised in the woods, grown on mast and fattened on the corn won by hard work from poor soil. We were comfortably housed, although the walls were beginning to bulge with the winter anties of five boys, the eldest just getting to the place where he could "make a hand."

The need for cash was not too heavy. We required about twenty dollars a year for taxes and thirty dollars for miscellaneous farm expenses. The coffee, salt and tobacco that composed most of our purchases came in trade for butter, eggs and poultry, as did the simple clothing requirements that we bought. However, with the exception of shoes, mother made most of our clothing. She spun wool and knitted socks, mittens and mufflers. Her busy needle kept us in shirts, and from "bought goods" she fashioned serviceable if not stylish "best" clothes. Altogether, $150 in cash would just about have covered our basic yearly needs. Of course, if there came a windfall, such as a good teaming job at two dollars and a half a day for man and team, the extra cash came in very well. The supply of fruit jars might be replenished, a new scythe and cradle acquired, or our meagre supply of farming tools enhanced by a more modern addition.

But '93 was bad. Eggs brought only three cents a dozen and butter three cents a pound, when these things could be sold at all. There were no teaming jobs. The little cash we had disappeared and no more was in sight. Father was worried that winter, and he told me many years later that often, as he lay in bed at night, he prayed that God would show him a way to solve his troubles.

His boys were growing up; the two eldest had absorbed about all the learning available in the little school that perched on the ridge three miles to the south. It was ten miles over bottomless winter roads to the county seat and a high school. How could they go? Board and room cost cash,—not much, but even a little was more than he could raise. Only by ceaseless, back-breaking toil could he break even now, and prospects were poor for any improvement. The added cash requirement looked like a hopeless obstacle.

All the decent land on the place was under the plow. Great Grandfather had cleared part of it and Grandfather had added to the acreage. It wasn't very good land. I know now it needed lime and drainage and legumes. But we didn't know those things. It seemed to Father that his only solution lay in putting some more land under the plow. If markets stayed as they were he might gain nothing more than an unsaleable crop, but he could use the manpower of his growing sons and, *if* things got better, he might turn enough extra money to make the grade.

The only land available was a forty that lay on the ridge back of the big spring from which came the water that supplied Grandmother's house and ours. It was virgin white oak on what we knew to be fairly thin soil. But the slope was not very steep, would plow well, and a few good crops after the stumps were grubbed and burned might pay well for the sweat of clearing.

There was a small sawmill in the village three miles away, but it bought few logs in '93. As a matter of fact, there wasn't much of a log market. We were too far back from the railroad and on mud roads. If we got any money out of that good oak, it would have to come from something we could haul out in fairly concentrated form. A neighbor told Father about a man who had a stave mill in the southwest corner of the county, so Father rode over to see him. Somehow he made a deal "on the shares." The man brought his mill in and set it up at the foot of the hill near the lane that connected our house and Grandmother's. Father and the two elder boys began clearing the forty in March after the local school was out.

They cut and lopped and bucked throughout the spring with only enough time out to get in a crop in the bottom field. The tops and culls went into ricks of firewood—four-foot wood for the big cast-iron Franklin heater that kept us warm and cooked our food. When hay and wheat harvest time came there was a good supply of stave butts ahead, and the mill kept working through the summer.

The boys had a good time. It was a lot more fun to work the timber than to chop out corn, and the smaller children and Mother could keep the weeds down anyway. The ham and cold beans and boiled sweet potatoes in their lunch basket were mighty good in the middle of the day. Both of them knew that the cash for a year in high school had to come from the logs they were felling and bucking and the crosscut went a little faster, perhaps, because of that thought.

The summer before, they had yoked and broken to work a pair of young steers. Now they used them in snaking the butts down from the ridge to the mill. Later they would yoke them to a sled and haul the rocks from the newly won field.

Father was the chopper. He notched and lopped and the boys sawed. It was a healthy summer for the whole family.

Toward August, with the wheat already threshed and the corn laid by, Father began to haul his staves to the railroad. He had a strong team, but his load limit was 1,500 pounds up the steep hills. So he could haul only about 300 staves. He would load in the late afternoon so he could be on the road by five o'clock the next morning. That night we'd hear him rattling along the creek road, about eight o'clock, whistling as he always did when his heart was light. He had three dollars in his pocket, half of which was his — another step toward school for his hard-working boys.

Altogether, we cut 60,000 staves from that forty. Father hauled steadily at every opportunity all that year and the next. He probably accumulated about $300 cash as his share of the stave money. By every economic criterion he lost a lot on the deal. Certainly he didn't pay the labor cost. He didn't even get a fair return for his hauling. But, he had $300, which was enough to send his two elder boys to high school.

They went, well stocked with provisions, which were replenished by occasional visits from Father and a supply of farm-grown "vittles." In 1897, father got himself elected to a salaried job, with a princely income of $50 a month. So we moved to town, but kept the farm. Food was still something to be raised, not bought.

Last fall I visited again the forty that Father and my older brothers cleared. It will be a long time before anybody raises corn on it again. Uncle Sam owns it now and the straggling sassafras that grows on it. Perhaps some day the Forest Service will plant it to pines and eventually it will again grow hardwoods. If the original oak were still there, it would be worth in the neighborhood of $1,000 on the stump. In 1893 its money value was much less, but it offered a means of getting a little cash when we needed it badly.

What was the social cost of this rotation? I don't know, but it made an important contribution toward the building of some pretty good citizens. If the original forest had been cut correctly instead of being cleared and plowed to abandonment, I am sure it could still be playing its part in building citizens.

To rehabilitate that land, society must invest the money that was taken out of it years ago. The public task, now, is to see to it that land is not robbed; that it is not necessary to destroy a resource in order that men may live decent lives.

OCD FORMS FOREST FIRE-FIGHTER UNIT

ESTABLISHMENT of a volunteer forest fire-fighters' service, patterned somewhat along the lines of city air raid warning service, has been announced by James M. Landis, director of the Office of Civilian Defense. Participating in this program is the Forest Service of the Department of Agriculture, the National Park Service, the Grazing Service, the Indian Service, the Fish and Wildlife Service and the General Land Office of the Department of the Interior, state forestry departments and other conservation and land management agencies.

The program, developed by the Forest Service in cooperation with the Timber Committee of the OCD, will operate through the committee and national and state coordinators. At the time of going to press, it was announced that David P. Godwin, assistant chief, Division of Fire Control, Forest Service, would serve as national coordinator, the state coordinators to be named later. Lee Muck, assistant to the secretary, Department of the Interior, is chairman of the OCD's Timber Committee.

The OCD will publicize the project, enroll and certify the participating fire-fighters. The various forest and land managing agencies will train, organize and direct the units in actual fire-fighting service. Units will be formed primarily from local residents in forest regions throughout the nation. These residents will be enrolled in the regular civilian defense manner, and will be furnished with arm bands, cards and automobile plates for purposes of identification.

Donald M. Nelson, chairman of WPB, commended the idea of the Forest Fire Fighters' Service and declared its members would be performing a valuable national defense duty by protecting critical war materials. He termed forests and timber vital to the winning of the war. The Navy and War departments added their endorsements.

PINCHOT ATTACKS DESTRUCTIVE LOGGING

GIFFORD PINCHOT, former governor of Pennsylvania, and first chief forester of the United States, on July 13 vigorously attacked large scale destructive lumbering in the state forests of Pennsylvania and called upon Governor Arthur H. James to "stop these violations, end this destructive lumbering, and put sound forestry in its place."

In a letter to Governor James, Mr. Pinchot said: "Our state forests are in danger from destructive lumbering, now going on under the largest sales of state forest timber ever made. No such threat to their welfare has appeared since they were first established half a century ago.

"Our state forests are of vital concern to the people of Pennsylvania. As a citizen, a forester, and a former commissioner in charge of state forests, it is my clear duty to report to you what I have learned and urge you to stop the damage.

"Stories of bad lumbering led me recently to examine two areas of state forest timber sold to lumbermen in the last two years. On both the Department of Forests and Waters had sold for cutting all sound trees of merchantable kinds above

certain sizes. Whether or not the trees were ripe for cutting; whether or not they should have been left to furnish seed for new growth, to maintain the forest cover, or to protect the soil from washing; whether, for any other reason, they should have been kept standing, made no difference. They were all cut anyhow. This is not forestry, but forest butchery.

"The war calls for wood, but not for forest destruction. We shall have need of our forests after the war is won. They can be used and safeguarded too. That is what forestry is for."

On one area, Mr. Pinchot said, between Eaglesmere and Hillsgrove, where all poplar trees fourteen inches in diameter, and beech, birch and maple twelve inches and up were sold without discrimination, great holes were left in the forest. No tops were burned, he revealed, leaving a dangerous fire trap. On another area near Ansonia, all pine and hemlock down to a diameter of fourteen inches were cut without discrimination. Here, too, he said, no tops were burned.

"The present cutting also gives a bad example to lumbermen, farmers, and other forest owners," he declared. "When they see the state forests abused, they are not likely to treat their own woodlands any better.

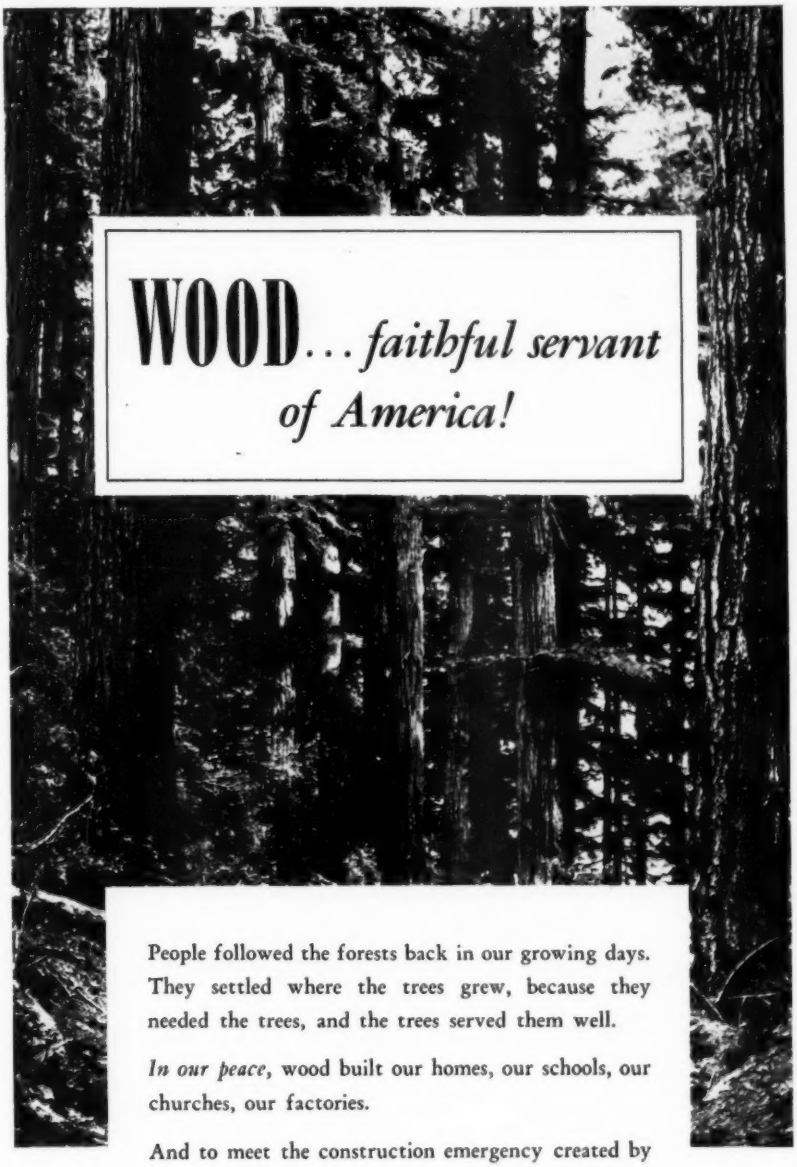
"As governor of Pennsylvania," Mr. Pinchot wrote Governor James, "you have power to enforce the law, stop these violations, end this destructive lumbering, and put sound forestry in its place. I believe I speak for our people generally when I urge you to do so."

Mr. Pinchot's letter was made public "because I believe the people of the Commonwealth, to whom the state forests belong, have a right to be informed of what is being done with their property."

Barrett Heads Ohio Experiment Station

APPOINTMENT of Leonard I. Barrett as director of the Central States Forest Experiment Station with headquarters at Columbus, Ohio, has been announced. He succeeds Dr. J. Alfred Hall, who has served as director of the station for the past three years, and who is now being transferred to Washington to serve as Forest Service consultant and advisor on the biochemical phases of the Department of Agriculture emergency rubber project.

Mr. Barrett is a native of Chicago, Illinois. He received his bachelor's degree in forestry from the University of Michigan in 1924, and a master's degree in 1926. For the past several years he has been in charge of forest management investigations at the Appalachian Forest Experiment Station at Asheville, North Carolina. He will assume his new duties at Columbus immediately.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SALVAGING FOREST SCRAP

By THERESA STEVENS

THESE are the days of salvaging scrap—scrap rubber, scrap iron, scrap paper, and now scrap timber.

Contrary to public impression, logging left-overs—slash, half-rotted butts, snags and branches—are not evidence of wasteful lumbering. While they are an eye-sore to the public, they are a much greater problem to the logging operator. They are really scrap timber, heretofore unmarketable forest material.

To the operator unmarketable material left on logged-over areas means not only bad public relations by its very unsightliness, but a real fire hazard. It is a menace to surrounding stands of timber, to seed trees left for reforestation and to seedlings that find root. Added to this is the economic waste of scrap timber. Such scrap while usable for by-products has been unavailable because of difficulties and costs of transportation from logged-off lands to the mills.

Under conditions of war, the problem has become even more vital, for the cry of the country is for all-out utilization of everything. Scrap materials must not be scrapped. As if in answer to this new and greater need, Bror L. Grondal, professor of Forest Products of the College of Forestry, University of Washington, has announced the development of a *portable* pulp mill wood-room.

This device is based upon the old theory that if the mountain will not come to Mohammed, then Mohammed must go to the mountain. In other words, facing the need for pulp during the war emergency and knowing the obstacles in the way of bringing waste material to the mills, Professor Grondal will take the mills to the waste material.

This comparatively small mill wood-room can be pulled by a tractor from one logging operation to another. Before its arrival workers will be supplied with a scale drawing of the area showing all log-ends, branches, stumps and snags in their exact position on the ground. The wood-room will be stopped for operation in a place chosen for expediency.

The portable pulp mill wood-room is mounted on a typical donkey engine sled. Equipment includes a cut-off saw, a short log sawmill, in which head saw and edger are combined in one unit, and post barkers. In short, the design uses standard equipment in a different way than it has been used heretofore, and five men will do a job, which, if done by hand, would require 100 men.

The left-over butts and branches will be cut into two or four foot lengths, rolled over the log deck and ripped and slabbed into eight inch widths. Then they will go on the barkers, one on each side of the machine, and the waste material cut off. What remains will continue through a chute into waiting cars. This salvaged scrap, immediately transported to the big mills, is all ready for processing. It will take up a minimum of space when it gets there. There will be no useless transportation of odd shapes and space crowding bulk. The residue as it is dumped from the portable wood-room in the logged-over area, will be already neatly piled in the wake of the machine ready for quick and easy disposal. The pulpwood so salvaged from logging scrap, according to Professor Grondal, will be of low grade, but usable for the manufacture of such items as insulation board.

In other words, the University of Washington design is made to salvage poor grade pulpwood, which might otherwise be lost because of the expense of bringing it in from the woods. At the same time, and in the same operation, its second job is to clean up logged-over areas and reduce fire hazard.

In accordance with its policy, the faculty of the College of Forestry at the University of Washington will take out no patents for the manufacture of the machine. The whole purpose in presenting it is to encourage further experiments for the expansion of forest industries and for the care and protection of forests. Even as this is written, Professor Grondal is answering an inquiry from a manufacturing firm in Everett, Washington, interested in putting the portable pulp mill wood-room on the market.

This is one of several such projects the forestry faculty is undertaking under a grant given in July, 1940, by the Washington State Planning Council after Governor Arthur B. Langlie had presented the need for such work to the Washington State Legislature. The grant was made for the purpose of establishing the industry and improving conditions in this area, which incidentally, is the greatest tree-clad area on earth.

A thorough job of field work was outlined and completed before plans for the portable wood-room as a solution to the utilization of scrap timber were begun. The entire project is under the general direction of Dean Hugo Winkenwerder. Professor Grondal is project supervisor. He is assisted by Dr. Harry Schrader, assistant professor of forestry; Dr. Frederick F. Wangaard, and William I. West, a graduate of the College of Forestry.

The project field work done called for a preliminary survey of typical logging operations, so located as to present typical problems as to situation and quality and quantity of left-overs. Quarter-acre plots were decided upon as workable examples in each area to be analyzed. These plots were studied under every imaginable economical condition native to the individual location. Every piece of slash, butt and branch in each quarter-acre was inspected and its condition tabulated as to rot, breakage, knots and other defects. Douglas fir, hemlock, spruce, cedar and other species had their separate places in the compilation.

Besides such scientific study in the woods, further research was carried on to cover the multitude of problems presented by the location of logging operations in their relationship to the location of lumbering manufacturers. In a written explanation of the whole study, Professor Grondal has acknowledged the assistance and cooperation given by both logging and lumbering firms.

These firms, besides wishing to promote any workable plan for the preservation and continuance of the forests, were anxious to find any and all possible means of utilizing what formerly had been expensive scrap material. They gave general assistance and made available to the field workers all necessary records and other data covering the experimental quarter-acres and adjacent lands that bore importantly upon them.

Twenty such experimental plots were charted to scale. Every piece of material was numbered and completely described in field notes. These charts, filed in Anderson Hall at the College, look with their criss-cross of uneven length and widths and polka dots for stumps, like surrealism studies in black and white, but they are in reality amazingly accurate accounts of every piece of slash and stumpage, carefully numbered and precisely scaled. The scientific minds that plotted them tolerated no guess-work in attacking the problem of utilizing even the lowliest of forest waste.

These charts are hieroglyphics telling an encouraging story of the spirit of science in World War II. In some instances in the development of the design for the portable pulp mill wood-room, according to Professor Grondal, obvious improvements have been indicated but not completed. This was done for the sole purpose of leaving an opening to encourage further private invention.

The College of Forestry dedicates this design, complete and proved practical, to the cause for which the Washington State Planning Commission intended it — to serve as a basis for further studies intended to find rational means for salvaging forest scrap material.

CONSERVATION CALENDAR

Important Bills in Congress with Action — June 11-July 15, 1942

BILLS ENACTED

S. 2599 — McFARLAND — Authorizing the Secretary of War to compensate holders of grazing permits and licenses for losses sustained by reason of use of the public lands for war purposes. Passed Senate June 26, 1942. Passed House July 2, 1942. Approved by the President July 9, 1942. Public Law No. 663.

H. J. Res. 324—CANNON, Missouri—Making appropriations for work relief for the fiscal year ending June 30, 1943. Passed House June 11, 1942. Passed Senate June 25, 1942. Approved by the President July 2, 1942. Public Law No. 651.

H. R. 6845—JOHNSON, Oklahoma—Making appropriations for the Department of the Interior for the fiscal year ending June 30, 1943. Passed House March 30, 1942. Passed Senate May 28, 1942. Approved by the President July 2, 1942. Public Law No. 645.

H. R. 7181—HARE—Making appropriations for the Department of Labor, the Federal Security Agency, and related independent agencies. Passed House June 5, 1942. Passed Senate June 26, 1942. Approved by the President July 2, 1942. Public Law No. 647.

FORESTRY

S. 2629—McNARY—To further amend section 3 of Public Law No. 270, approved June 7, 1924, providing for forest perpetuation and extension, by increasing the annual authorization therefor and extending aid in combatting tree insects and diseases. Introduced June 26, 1942. Referred to the Committee on Agriculture and Forestry.

GOVERNMENTAL FUNCTIONS

S. 2600—GILLETTE (H. R. 7338—ANDRESEN)—To expedite the prosecution of the war by making provision for an increased supply of rubber manufactured from alcohol produced from agricultural or forest products. Introduced June 18, 1942. Referred to the Committee on Agriculture and Forestry.

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CONSERVATION IN CONGRESS

REGULAR forestry and conservation activities of the Federal Government fared well in the 1943 fiscal year appropriation acts, as compared with appropriations for the fiscal year ending June 30, 1942.

As this issue goes to press the Department of Agriculture Appropriation Bill, H.R. 6709, is still in disagreement on parity prices; however, all forestry and conservation items have been agreed to by the House and Senate and will become effective when the law is signed by the President. Of particular interest in the agricultural bill is the $3,000,000 increase in emergency forest fire control funds as finally agreed upon by the Senate and House after the latter had rejected the $5,000,000 Senate increase. Half of the increase will be used for fire control operations on national forests and the other half on State and private lands under the Clarke-McNary Act. This amount, combined with the $5,812,000 appropriated for emergency forest fire control item in the Sixth War Power Act, and an additional $95,900 granted the Department of Interior for emergency forest fire control in H.R. 6845, will help somewhat to offset the loss of the forest fire fighting facilities of the Civilian Conservation Corps, recently liquidated by Congress.

The Forest Service appropriation, as contained in H.R. 6709, totals $20,184,285, as compared with $20,025,830 in the 1942 fiscal year, an increase of $158,455. National forest protection and management was increased $1,586,989 over the last fiscal year to a $12,766,446 total, while the Clarke-McNary cooperative forest fire prevention item was increased $1,575,000 to a $4,000,000 total. Funds for acquisition of national forest lands were cut $1,759,138 to a $354,210 total, and the item for construction and maintenance of national forest roads and trails was reduced $2,990,165 to a total of $7,000,000. Forest products research will receive an even $1,000,000 for 1943 fiscal year operations, an increase of $33,687 over the last fiscal year.

Private forestry cooperation received a $13,000 increase while several other activities were reduced as follows: general administration, $32,000; range investigations, $17,600; forest survey, $50,000; forest economics, $22,500 and forest influences, $3,800. A $55,000 reduction in the forest management research item has forced the closing of the Northeastern Forest Experiment Station at New Haven, Connecticut.

The white pine blister rust control item was increased to $1,949,000 in 1943, as compared with $1,291,560 in 1942, an increase of $657,440. Of the total, the Bureau of Entomology and Plant Quarantine will receive $730,000 for cooperation with state and private land owners; the Forest Service $1,044,000 for control work on national forests and the Department of Interior $175,000 for operations on lands under its jurisdiction. Dutch elm disease eradication will receive $356,500, which is over $3,000 more than was appropriated for this purpose in the 1942 fiscal year. The gypsy and brown-tail moth control item was increased $4,000 to a $382,600 total. Senate increases in the latter two items, for technical supervision of WPA employees assigned to these projects, were disallowed by conferees who agreed that work

CONSERVATION IN THE 1943 APPROPRIATION ACTS

Appropriation and Project	1943 Appropriation	1942* Appropriation
Department of Agriculture		
Forest Service	$20,184,285	$20,025,830
General Administrative Expenses	573,000	605,030
National Forest Protection and Management	12,766,446	11,179,457
Fighting Forest Fires	100,000	100,000
Private Forestry Cooperation	114,000	100,928
Research—Forest Management	556,500	611,712
Range Investigations	255,500	273,103
Forest Products	1,000,000	966,313
Forest Survey	202,629	252,629
Forest Economics	119,000	141,490
Forest Influences	133,000	136,820
Forest Fire Cooperation	4,000,000	2,425,000
Emergency Forest Fire Control	5,000,000	1,100,000
Acquisition of Lands for National Forests	354,210	1,797,348
Acquisition of Lands from Receipt Funds		316,000
Soil Conservation Service	22,427,200	25,602,100
Miscellaneous—Department of Agriculture		
Cooperative Farm Forestry, Total	700,000	700,000
Includes:		
Extension Service	107,000	107,000
Forest Service	163,982	461,982
Soil Conservation Service	427,018	129,018
Dutch Elm Disease Eradication	356,500	353,345
White Pine Blister Rust Control, Total	1,949,000	1,291,560
Includes:		
Bureau of Entomology and Plant Quarantine	730,000	490,892
Forest Service	1,044,000	685,668
Department of the Interior	175,000	115,000
Gypsy and Brown-Tail Moth Control	382,600	378,410
Forest Insects—Studies and Control	199,680	214,665
Diseases of Forest Trees	258,460	256,835
National Arboretum	54,892	54,662
Naval Stores Investigations	118,456	116,605
Japanese Beetle Control	382,275	427,805
Department of the Interior		
Fish and Wildlife Service	5,911,600	9,583,915
National Park Service	4,873,000	5,263,775
Grazing Service	859,800	1,125,000
Soil Conservation—Public Lands	1,340,000	2,178,700
Emergency Forest Fire Control	95,900	
O. and C. Lands	248,750	200,000
Prevention of Fires in Alaska	27,650	27,300
Indian Forests:		
General Administration	381,900	389,710
Sale of Timber	125,700	118,790
Suppression of Forest Fires	15,000	95,000
General Public Works		
Roads and Trails—Forest Service	7,000,000	9,990,165
Roads and Trails—National Park Service	179,850	3,000,000
Blue Ridge, Natchez Trace and George Washington Memorial Parkways	269,200	6,000,000
Civilian Conservation Corps	8,000,000	246,960,000
Tennessee Valley Authority (Forestry, Wildlife, Recreational Development)	728,539	653,224

*Including deficiency and supplemental appropriations.

of this type, which was begun under relief appropriations, should not be transferred to regular departmental appropriations but continued as an emergency matter. Conferees allowed the $15,000 Senate increase in the forest insect studies and control item, providing for continuation of studies on insect vectors of the Dutch elm disease, bringing the total appropriation for this item to $199,680, a decrease of $14,985 over last year.

Forestry and conservation activities of the Department of the Interior received substantial cuts, as compared with last year, in H.R. 6845, the Interior Department Appropriation Act, which was approved July 2 and is now public law No. 643. While the Fish and Wildlife Service was cut $3,672,000 to a $5,911,600 total, this amount is $364,460 more than was allowed by the House. The National Park Service was reduced $390,500 to a total of $4,873,000, while the Grazing Service received a $265,000 decrease to a $859,800 total. Although soil and moisture conservation activities of the department were reduced $838,700 to a total of $1,340,000, Congress allowed an additional $95,900 for "fire protection of forests, forest industries, and strategic facilities (National Defense)." The latter amount will be combined with the $812,000, provided in Public Law No. 528 to protect strategic war-time facilities on lands under the jurisdiction of the Department of the Interior.

The item for general administration of Indian forests was decreased $8,200 to a $381,900 total, while funds for supervising sales of timber from Indian lands was increased $6,900 to a total of $125,700. Suppression of forest fires on Indian lands received a total of $15,000 as compared with $95,000 during the 1942 fiscal year. However, this discrepancy will probably be made up with deficiency appropriations throughout the 1943 fiscal year. The item for maintenance and construction of the National Park Service roads and trails was reduced $2,820,000 to a total of $179,850 and the Blue Ridge, Natchez Trace and George Washington Memorial Parkways item received $269,200, a cut of $5,737,000 over the previous year.

The Soil Conservation Service will receive $22,427,200 during the 1943 fiscal year as compared with $25,602,100 last year.

The largest single cut in forestry and conservation activities occurred as a result of the liquidation of the Civilian Conservation Corps (See page 379). Here the reduction was from $246,960,000 in 1942 to $8,000,000 during the 1943 fiscal year. The latter amount will be used to wind up the affairs of the Corps.

Senator McNary, on June 26, introduced S. 2629 which amends Section 3

(*Continuing on page* 383)

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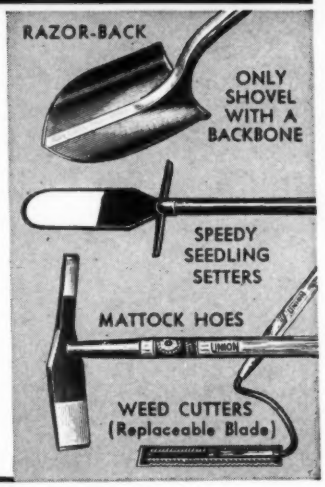


Take A Pack Trip!

In the belief that an opportunity for many to vacation briefly this summer in the unspoiled wilderness is in the interest of national health and national morale, The American Forestry Association scheduled four Expeditions of Trail Riders of the Wilderness.

The first, into the Great Smoky Mountains of North Carolina, has been successfully concluded.

The second and third, into the Sawtooth Wilderness of Idaho and the San Juan Wilderness of Colorado, are now under way.

There is still time to ride with the fourth and last expedition, listed below, if you act immediately.

August 5 to August 15—Snowmass Wilderness, Colorado.
$133 from Glenwood Springs

Here is a land of towering peaks, alpine lakes and rushing streams — a land to challenge any wilderness lover. Snowmass Lake, one of the beauty spots of America, lies in its fastness. There are four peaks more than 14,000 feet above sea level — Castle, Maroon Bells, Pyramid and Snowmass. It was to this wilderness the Ute Indians came to hunt and fish. It was to this wild region also that famous Chief Ouray made annual trips to commune with Nature and the Great Spirit. Trail Riders will find this high country as primitive and as inspirational as did Chief Ouray.

These expeditions are carefully organized with experienced guides, packers, wranglers and cooks. A physician is with each party; so is a representative of The American Forestry Association. Nearly six hundred men and women have participated in forty-three expeditions since 1933. So make this your year to ride with the Trail Riders of the Wilderness—rebuild mentally and physically for the important days ahead.

THE AMERICAN FORESTRY ASSOCIATION
919 Seventeenth Street, N. W. Washington, D. C.

SEEDING AND PLANTING IN THE PRACTICE OF FORESTRY, by J. W. Toumey and J. F. Korstian. John Wiley & Sons, 440 Fourth Avenue, New York City. 520 pages, illustrated. Price, $5.00.

Covering the art and science of forest nursery and planting practice, this is the third, revised and enlarged, edition of a standard book for the guidance of forestry students, foresters, nurserymen, forest owners and farmers, and an invaluable textbook for teachers of forestry. Special expansion has been made of Chapter VII, "Planting Surveys and Plans," because of the present-day stress of the production of nursery stock for planting on particular sites, and the necessity for meeting the greatly enlarged planting programs by federal, state and private agencies.

TRENDS IN LAND USE IN NORTHERN MICHIGAN, by Horace J. Andrews and Willard S. Bromley. 45 pages, ills. Published by The Charles Lathrop Pack Forestry Foundation, Washington, D. C.

The studies for this report were begun by Dr. Andrews when he was professor of wild land utilization at the University of Michigan. The region can be removed from the "problem area" category, the report sets forth, through a program of wide range planning for land use, classification, zoning, management of all natural resources, and thorough cooperation between public and private agencies. Conditions in the cutovers—the "wild lands" —have definitely improved in the past fifteen years and, the report declares, "the region is now emerging physically, economically and socially from the difficult times that followed the practically complete removal of the original forests."

This report is the result of the second Pack Foundation project devoted to studies of conservation in the Lake States Region.

DAVID LUBIN — A STUDY IN PRACTICAL IDEALISM, by Olivia Rosetti Agresti. Published by the University of California Press, Berkeley, California. Illustrated. 372 pages. Price, $2.50.

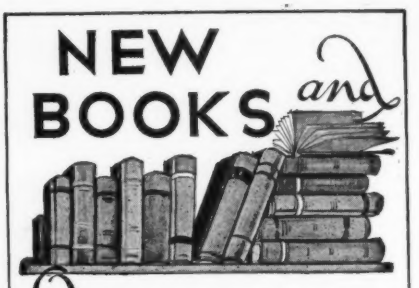
This is the inspiring story, — and the true biography, of a great personality. Inspiring because his beginnings were so very humble, from his birth in Russian Poland in 1849, and great because of his achievements. For David Lubin pioneered in many fields. Imbued with a reverential ideal of righteousness, he applied his ethical codes practically, as his sphere of influence extended from his own simple business and reached out into the economic life of his state and country. His passion for justice and service found expression when he mastered agricultural economics, and step by step through a series of coordinated efforts became not only a national but an international figure until, at his International Institute of Agriculture, he "sat at the table with kings." He pioneered for this world organization of agricultural interests and labored unceasingly for its establishment, because he believed it fundamental to an enduring world peace. The author has written more than a biography in this book, for it serves to flash brilliantly on the screen of today ideals of righteousness in the relations of men essential to the survival of humanity.

OUR SHADE TREES, by Ephriam Porter Felt. Published by Orange Judd Publishing Company, New York. Illustrated. 316 pages. Price, $2.00.

This, the second edition, offers up-to-date information on the care of shade trees by incorporating the knowledge gained through damage to trees by the New England hurricane of September, 1938, and the great ice storm that reached from New Jersey to Rhode Island in March, 1940.

The book contains eight chapters with many subheadings in each. Chapter 1, for instance, deals with the topic of shade trees and men, and under subheadings discusses such subjects as home grounds and trees, the tree expert, camouflage and trees, and many others. Chapter 4 deals with the troubles of shade trees — the Dutch elm disease, lightning, winter injury, etc.

The author, well known in his field through other books and writings, is director and chief entomologist of the Bartlett Tree Research Laboratories, and from 1898 to 1928 was state entomologist of New York, as well as editor of Journal of Economic Entomology from 1908 to 1935.



A list of Selected Books on Forestry and related fields of Conservation is available to members of The American Forestry Association on request.

The publications listed below must be ordered direct from the addresses as given and not through the Association.

Visiting South America's National Parks, by T. Gilbert Pearson. International Committee for Bird Preservation, 1006 Fifth Avenue, New York, N. Y.

Wild Flower, July, 1941. Wild Flower Preservation Society, 3740 Oliver Street, N. W., Wash., D. C. Price, 40 cents.

The Manufacture of Wood Charcoal. Forest Commission of Victoria, Leaflet No. 1. State Public Offices, Melbourne, C. 2, Australia.

Forest Resources of Miami County, Ohio, by Nelson Schlemmer. Ohio Forest Survey Rep. No. 5. Dept. of For., Ohio Agr. Exp. Sta., Wooster, Ohio.

Wildlife of the Atlantic Salt Marshes, by W. L. McAtee. Fish and Wildlife Service, U. S. Dept. of the Int., Wildlife Circ. 11. Supt. of Docs., Wash., D. C. Price, 15 cents.

Bibliography of National Parks and Monuments West of the Mississippi River, Vols. I and II. Prepared at the Western Museum Laboratories of the National Park Service with assistance provided by the Works Projects Administration—Official Project No. 165-2-08-254, and Civilian Conservation Corps. Nat. Park Serv., Dept. of the Int., Wash., D. C.

After the War—Full Employment, by Alvin H. Hansen. National Resources Planning Board. Govt. Printing Office, Wash., D. C.

Michigan Log Marks, Edited by Clifford Allen and Harold Titus. Mich. State College Memoir Bull. No. 4. Agr. Exp. Sta., East Lansing, Mich.

Estimating the Economic Effects of Planned Conservation on an Individual Farm, by Arthur C. Bunce and George W. Collier. Soil Cons. Serv., U. S. D. A. Misc. Pub. 463.

Toward Soil Security on the Great Northern Plains, by Glenn K. Rule. Soil Cons. Serv., U. S. Dept. of Agr. Supt. of Docs., Wash., D. C. Price, 15 cents.

The Grazing Bulletin—April, 1941. Grazing Service, U. S. Dept. of the Interior, Wash., D. C.

Junior Conservation Organizations, by Charles F. Welch and Harold Lillie. Div. of Education, Dept. of Conservation, Lansing, Michigan.

State Park and Forest Commission—14th Biennial Report and *State Board of Fisheries and Game—23 Biennial Report.* Published by the State of Connecticut at Hartford, Conn.

Lands, Parks and Forest Branch of the Canadian Dept. of Mines and Resources, Annual Report. Edmond Cloutier, Ottawa, Canada.

CCC BEGINS LIQUIDATION

THE camps of the Civilian Conservation Corps, ordered closed by a 230 to 120 vote in the House on June 20, were empty as this issue goes to press. By July 15, 70,000 enrollees were on their way to their homes, leaving only skeleton crews to attend those duties essential to the closing or movement of camps, equipment and supplies. These were expected to leave before August 1.

Meanwhile, War, Navy and Civil Aeronautic officials were meeting with CCC Director James J. McEntee to arrange for the transfer of CCC equipment and supplies to these agencies. Practically all equipment and supplies, valued at $75,000,000, not including housing, are on the "critical materials" list and greatly sought after by all war agencies. Already, it is reported, more than 100,000 pairs of black shoes in CCC warehouses have been acquired by the Navy. Tractors and graders have been moved to the scenes of vital war construction. Steel cots and uniforms are earmarked for the Army.

The House action closing the CCC camps was in refusal to concur in an amendment placed in the Federal Security Agency appropriations bill by the Senate which would have provided $76,000,000 for continuation of the Corps.

Because the favorable CCC action in the Senate was by but a single vote, no effort was made on the part of the Senate to continue the controversy with the House once the latter had voiced its second disapproval by so large a vote. In fact, the conference committee of the two houses had agreed, prior to the House vote, that if the House refused to accept the Senate amendment that the committee would agree to recede from the Senate position. The Senate conference did, however, succeed in making the House recede from an amendment passed by the House which would have vested in the War Department authority to liquidate and terminate the CCC. As finally agreed to by both houses, this power of liquidation was vested in the director of the CCC. An appropriation of $8,000,000 was provided for this work.

WPB ASKS FOR INCREASED LUMBER PRODUCTION

DESCRIBING lumber as one of the nation's most essential war materials, Donald M. Nelson, War Production Board chairman, has taken the following action to help boost lumber production:

Appointed Frederick H. Brundage, associate regional forester, U. S. Forest Service, Portland, Oregon, as western log and lumber administrator of the Lumber and Lumber Products Branch of the WPB. To advise and assist Mr. Brundage, an advisory board will be appointed for the western lumber industry. This board, including management and labor members, will be representative of the various segments of the industry.

Woods and mill employees have been asked to forego a vacation this summer. The request by Mr. Nelson was made through the International Woodworkers of America and the International Brotherhood of Carpenters and Joiners. Employees working in the woods and in the sawmills were asked to accept instead the money payment for the vacation while working for wages during the vacation period. Furthermore, they were asked not to leave their jobs for other employment.

At the same time Mr. Nelson requested forest owners and operators to step up production by logging at this time the best and most accessible timber in the region. Operators were also requested to utilize their existing equipment to the fullest extent and to conserve on the use of trucks by substituting water and rail transportation of logs wherever that can be done without reducing log output.

The WPB chairman further appealed to governors of certain states to eliminate transportation rules and regulations which restrict lumber production. This is particularly aimed at those states which forbid overloading of trucks, or the hauling of logs on Sunday. He arranged with the Selective Service System for the listing of "critical occupations" in the lumber industry so that skilled woods or mill workers may receive temporary deferment from military service. He furthermore arranged for improved methods of granting repair and maintenance priorities to the industry.

"Lumber from every region in the United States is an important and critical material in our whole war program," said Mr. Nelson. "It is needed for the construction of cantonments, ships, planes, gliders, pontoons, war housing, for Lend-Lease, for packaging war products, and as a substitute for critical materials in the war program. The production of war materials such as lumber from the woods and copper from the mines is just as important in preparations for defeat of the Axis as is the production of finished war items made from such raw materials."

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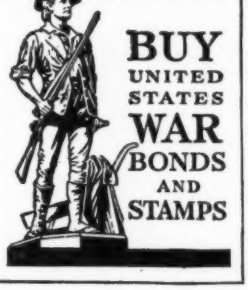
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An Opportunity to Pay Tribute to Fire Heroes

The American Forest Fire Medal Board recognizes outstanding cases of personal heroism in fire fighting by awarding the Forest Fire Medal. The Board consists of a representative of The American Forestry Association, Society of American Foresters, Charles Lathrop Pack Forestry Foundation, Association of State Foresters, and the National Lumber Manufacturers' Association.

In order to establish this Award on a permanent basis, a fund or foundation of not less than $3,000 is necessary. Cash balance on hand totals $2,541.17. Your assistance in completing this fund is hereby solicited. It is believed that foresters, forestry, park, and all forest protection associations, as well as other conservation groups, will welcome the opportunity to contribute. Contributions should be sent to:

THE AMERICAN FORESTRY ASSOCIATION

919 SEVENTEENTH STREET, N. W.
WASHINGTON, D. C.

FEDERAL AGENCIES MOVE IN AUGUST

THREE agencies of the Department of the Interior—the National Park Service, the Fish and Wildlife Service, and the Office of Indian Affairs—will move to Chicago in August, according to an order issued at the time of going to press. Space for the three agencies has been leased in the Merchandise Mart. Approximately eight hundred employees will be affected by the transfer, which is part of decentralization of various government departments to relieve wartime congestion in Washington.

The Office of Indian Affairs, headed by Commissioner John Collier, is scheduled to move on August 11. The Fish and Wildlife Service, led by its chief, Ira N. Gabrielson, will follow, moving on August 16. The National Park Service, headed by Director Newton B. Drury, is not scheduled to move until August 28. All three agencies will maintain skeleton staffs in the National Capitol for liaison work. Liaison officers are expected to be announced by all three agencies around August 1.

THE GUAYULE RUBBER PROJECT

(*Continued from page* 349)

proved to be a bumper one, yielding several times the amount of seed anticipated.

In the meantime, experts of the Department have been surveying possible planting areas in the southwest and studying native guayule growth in the Big Bend section of Texas and north central Mexico, where four guayule factories are operating. And in regional research laboratories of the Department, biochemists are working on more efficient methods of extracting rubber from guayule.

From all standpoints the guayule project is well out ahead in the rubber-growing race. At the Salinas nursery today are enough seedlings to plant between 40,000 and 50,000 acres. This mammoth planting job will start in late November and extend throughout the winter on lands which the Government has leased for the growing of guayule. In addition, the July harvest of seed from existing guayule plantations will permit substantial enlargement of the project. The expansion of the project will, of course, depend upon raising the statutory limit of 75,000 acres of plantations, ability to find suitable land for the establishment of guayule plantations and upon funds and labor with which to extend the work.

HERMIT CRUISE

(*Continued from page* 346)

total disappearance of the trail which should lead eastward into Burt Lake.

Approaching the tip of the lake, I paddled slowly, watching for blazes to mark the beginning of the portage. But only faint scars were discernible on two dead tree stumps, with no sign of the trail. Convinced that the path had been obliterated by time, I resolved to walk due east without the packs. Perhaps there would be some trace of it at the next lake. Also, I could select a way through for the canoe if my search proved unsuccessful. Several times beaver trails raised my hopes, only to end them at a clump of hewn birches, from which the industrious rodents had dragged the branches towards the shore of Burt.

Having spent most of the afternoon in fruitless exploration, there was nothing for me to do but make the portage without a trail. This proved easier than expected, but one incident gave me food for thought. On what appeared to be the best route, I suddenly found myself in a gully strewn with moss-covered boulders. Unable to turn back, I moved on with caution. Suddenly the ground gave way and, before I realized what was happening, I was up to my armpits between large rocks, the canoe resting firmly above me. Shaken, I was soon free and again making my way slowly among the boulders. But I could not put aside the sobering thought of my plight had my leg been broken or the canoe smashed. Right then and there I resolved not to return over this trailless portage if there was another way out.

With only an hour of daylight remaining, I paddled vigorously toward two sheltered points of land on the opposite shore of Burt. One of these would have to do. So would a quick supper. And as I climbed into my sleeping robe, I became aware of aloneness for the first time. Not even a trail joined me to the world from which I had come. Somehow it gave me a grand feeling of self-sufficiency—but when the wolves began to howl at the new moon a companion would have been welcome.

After resting a day at this lonely camp, I was ready to push on. But not before I had sampled of fishing for the first time. Small-to-medium walleyes were in abun-

dance, and after hooking a dozen, I saved the last four for supper and breakfast.

Since the last portage had given me considerable trouble, I made an explorative trip without the packs over the one ahead, finding the trail discernible but not easy. Much down timber obstructed the path and bushes obscured a clear view of the little-used route. As a precaution, I renewed the blazes.

A large beaver dam and pond midway between Burt and Marj lakes required the better part of an hour to negotiate. The water was deep but choked with floating logs and standing timber. Several times I had to back the canoe out after inching in among the trees. When I finally set the canoe down on Marj Lake it was with a feeling of conquest.

The shores of Marj are precipitous and my heart sank as I scanned the densely wooded slopes for a suitable campsite. None were in evidence, so I set off along the shoreline, using the motor. Finally, and as a last resort, I headed into a bay where the low rays of the sun shone upon what appeared to be a glade of open ground among the pines. Such it proved to be, and my feeling of relief grew as I found all the makings of an ideal camp. Lodgepole pines were in profusion, and there was an abundance of dead wood close at hand for the fire. There were rocks for the fireplace, a level space carpeted with dry moss for the tent, and shelter from prevailing winds.

It combined so many good features that I determined to indulge my secret passion —to remain several days just fishing and building up the camp with all the conveniences I'd been wanting. With this prospect, the cooking fire burned so brightly and so steadily that the biscuits were a triumph, the dehydrated vegetable soup, mashed potatoes and apricots soul-satisfying.

The next day was warm and sunny and by noon I had discovered that lake trout were right in my own bay. I reeled in five four-pounders, returned to camp to soak a liberal mess of beans, and headed for the next bay north. There I found walleyes, though not the big ones I had been told about. But they were plentiful and by evening I had saved enough of the best ones for three fish dinners.

After a good sleep and a breakfast of pancakes, my ambition to reach Joyce Lake, my outbound designation, was rekindled. But I had spent such loving care on the Marj camp that I decided to make sure what Joyce was like before moving my equipment. So I paddled the empty canoe towards the first of the two portages between Marj and Joyce—empty except for fishing tackle, raincoat and lunch of rye crisp and summer sausage.

The trails were not clear. Bushes branched across the path, hiding it from casual view. Occasionally branches had been broken for a blaze, and the withered leaves were still attached. From this I reasoned that one party at least had passed this way during the year. I renewed the blazes in the event I should return after sunset.

Happily, Joyce Lake lived up to my fondest hopes, and I stood beside the canoe at the end of the portage gazing with rapture on a beautiful body of water. Here was the end of the trail. Except the one on which I was now standing, no path led away from this lake. Numerous small islands were scattered everywhere and I knew that around these were fish—inexperienced fish which would welcome the bait of a mediocre fisherman.

I paddled around the nearest islands for an hour or so and hooked fourteen walleyes, releasing all but two. Here, indeed, was paradise for the angler. With this happy knowledge I headed back toward camp, eager to return the following day to explore the entire lake and, for the sake of variety, to locate other species of fish. Walleyes were good eating, but bass were more sport. Driven by this prospect, and also the pleasant thought that camp was already made, with a nice pile of wood ready for supper, I made the return trip in good time.

It began to rain while the fish were frying and I had to eat sitting in the doorway of the tent. Nor did it let up after the pans had been shoved out to wash themselves and I had set to work on my maps in dim candle light. But I didn't mind; there were too many plans to be made. Now that I had been out nine days, my return trip required careful attention. For example, in order to avoid the "no trail" portage back to

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Paulene Lake I would have to make a longer circuit. Unknown difficulties might await me on this new route, but I'd rather risk these than the known bad spots. My food was working out according to plan, so it appeared that I could spend one more day at Joyce Lake. With this joyful prospect, I went to sleep to the lullaby of rain on the tent.

It was still raining in the morning and my kitchen floor was a wide pool of water. Dressing leisurely, I loafed in the tent, sharpened the ax and knife and considered with some misgivings the two rocky portages back and the treacherous footing in the rain. And the more I thought and the harder it rained there came the realization that my plans for an extra day at Joyce must be abandoned. Sadly, there seemed no other choice than to pack for the journey back to civilization.

The tent was struck in a downpour and some water got inside. Then followed events that stand out in my memory—traveling all day in a drenching rain and making camp in a darkness of wind and rain. Naturally it was miserable at the time, but I enjoy looking back at it all as an achievement in survival and a contrast to ordinary comforts. Without the dark spots the bright would not seem so enjoyable. And I picked up some good knowledge. The experience of finding pools of water on the tent floor and most of my food and spare clothing wet inside the packsack when I finally settled down on Burt Lake that night was far from comforting. From now on a rule will be to start out with new, watertight packsacks. Also, I have every intention of keeping the flaps buckled down carefully so rain cannot blow inside; and I will find a way of standing the pack in the bottom of the canoe so that it will not lie in water. Certainly, if possible, I shall in the future avoid breaking camp in heavy rain.

It was almost imperative to spend the next day drying out the food and equipment. And it was not an easy job. Most of the small wood was soggy and it required special effort to keep a hot fire going. Too, I was forced to keep food and clothing where they could be rushed back into the tent when occasional showers came up. But I made out, though my pancakes were lumpy for the rest of the trip.

In spite of a short though heavy rain the following morning, two easy portages put me on Susanette Lake. And it was here, while paddling against a strong north wind, that I discovered the motor would not start. So for miles and seemingly for hours I strained at the paddle to make progress foot by foot, keeping the bow of the canoe just a point off the wind. When I allowed it to swing too far from the wind, the greatest effort would not prevent the craft from rolling in the trough of the swells. My course turned sharp left around a point of land, but I was forced to paddle well beyond the point in order to make a quick and precise turn and to keep the canoe riding across the waves and not parallel to them.

The same wind, however, helped me when I reached lovely Brent Lake in the glow of a fine sunset. On an island near the southeast end I knew of a fine campsite and paddled toward it. As I suspected, it was occupied but it was too late to stop and visit with the first people I had met in nine days, though the urge to do so was great. So I headed for a neighboring island which looked promising.

It turned out to be more than that. It had everything the voyageur's heart could desire. Smooth rock rose from the water rather steeply, but there were convenient places for landing and dipping water. A rocky ridge of timber on the northern side curved around a small level meadow of grass and blueberry plants, sheltering this nook on two sides.

Stakes would not hold in the loose, shallow loam, so I slipped thin poles through the loops of the tent floor and weighted them down with rocks. Blueberry shrubs made a springy and comfortable mattress. This is the island camp to which I would take my family for a two weeks' vacation.

As I prepared for bed, I was struck by the unnatural appearance of clouds toward the north. They seemed lighter than the sky around them, and too regular in shape. As twilight faded, these clouds became brighter and stretched long fingers and bars toward the zenith. It was then I knew I was witnessing a display of northern lights more magnificent than I had ever seen before. Great arcs of scintillating light moved majestically from the northern horizon to overhead, dropping forests of tree-like shapes toward the ground on their way. Giant searchlights focussed their beams and searched the sky, crossing and re-crossing. It was midnight before I could tear myself away from this spectacle.

The remainder of my journey back to civilization required four days of easy traveling over the same route I had used coming in. My last breakfast consumed the last slices of bacon. The coffee ran out the day before, and I used the last pinch of tea with the last tablespoon of sugar. There was a cupful of cornmeal left, which I spread on the rocks for the birds. Naturally, I was justly proud that my supplies had worked out as planned.

Looking back, I would say that camping alone is the ultimate in freedom. But like other freedoms, it is purchased at a price—greater hazards, more work. Would I do it over again alone? You bet—if I could not find the right pardners.

CONSERVATION IN CONGRESS

(*Continued from page* 377)

of the Clarke-McNary law to provide $9,000,000 annually for cooperative forest fire prevention and $1,000,000 to extend cooperation to states and private owners in combatting tree insects and diseases. Long needed by states and private owners, this additional authorization will, if enacted and the sum later appropriated, more adequately protect the nation's forests from fires, insect and disease attacks.

Providing $10,000,000 for construction and maintenance of access roads to sources of raw materials, H.R. 6908 was approved July 2 and is now Public Law No. 646. It is understood that part of this fund will be used to develop national forest roads and trails to inaccessible timbered areas of special value to the war effort.

Approved on July 9, Public Law No. 663, authorizes compensation by the War Department to holders of grazing permits and licenses for losses sustained by reason of use of public lands for war purposes.

Purchase of 28,733 acres at a cost of $101,257 for incorporation into national forest units in twenty states was approved by the National Forest Reservation Commission at its June 16 meeting. Of the total area, 27,326 acres will be acquired from regular appropriations under the Weeks Law at a cost of $95,907, and 1,407 acres, costing $5,350, will be added to existing forests under special acts of Congress authorizing the use of national forest receipts. Three proposed forest receipts funds purchases for California national forests were again disapproved by the Commission. Chairman Ickes objected to purchase of these lands because they support no forest growth. He proposed an investigation of Forest Service proposals to enlarge national forests with non-forest land. The Commission also approved twenty-four land exchanges, involving 18,744 acres under which the United States will receive lands from private owners within the boundaries of national forest units in exchange for government-owned lands or timber of approximately equal value.

ON THE TRAIL OF SIERRA WILDLIFE

(*Continued from page* 368)

munks were digging for food under the den tree, but these were never molested. About three hundred yards along the lake shore were dense willow clumps and it was in these the weasel found a bountiful supply of mice. After capturing a mouse it was interesting to watch the little carnivore hold its prey by the shoulders and go galloping back to its den with incredible speed.

After returning from the high country in mid-September we went far down the western slope of the Sierra to the chaparral-covered foothills to try for some mammal pictures we very much wanted to get. Our technique was to spread honey, cheese, bread, raisins and bits of fresh meat in likely places before the focused cameras. When an animal would come near the baits we used a weak flashlight to ascertain when it was within the field and range of focus; then, as it assumed the desired position and pose, we opened the cameras and flashed the powerful photoflash. In this manner stills both in black and white and kodachrome were made of gray foxes, coons, skunks and ring-tailed cats.

The ring-tailed cats are very timid and if they came at all to the baits it invariably would be after the other animals had retired. In spite of their shy nature, however, they frequently take up residence in an occupied house. We talked with several people at a government camp who had ringtails living in their attics.

One night as we were photographing a half-grown California gray fox, a California striped skunk came ambling out of the brush toward our set, its bushy tail held stiffly erect. The fox did not run away as we expected and hoped it would do, but continued to lick honey off the ground quite unmindful of the impending disaster. The skunk came on at increased speed, but stopped abruptly in firing position less than a foot away. We were so sure the fox was going to be sprayed that we thought we could smell the powerful scent, but later decided it was merely a psychological illusion.

A few nights later a California coon, feeding at the same place, was charged by a skunk, presumably the same one, with similar results. Like the young fox, the coon refused to be bluffed and the skunk refused to shoot, so both ate the baits together.

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LIGHTNING OVER THE FOREST

(*Continued from page* 352)

to do with knowing where lightning is most likely to strike? Well, we've shown how the Weather Bureau can predict—for two days in advance, incidentally—the horizontal and vertical location of a thunderhead not yet born. All the forest-guardians need to know in addition is the effective range of lightning. And that, calculations have shown, is about 2,500 feet.

So a man in charge of a forest lying under 1,000 feet altitude wouldn't be worried when he learned that a thunderstorm was due at a 10,000-foot level. The lightning strokes wouldn't be likely to reach to the ground. But suppose a storm is predicted in the 6,000-foot level in an area where the peaks tower 10,000 feet high. The man responsible for that particular section would deploy most of his fire-fighting force between the 3,500 and 6,000-foot levels, knowing that the woodland above and below that strip is relatively safe from harm.

There are great sectional differences in the per cent of forest fires caused by lightning. In the East, less than one per cent of such fires are laid to thunderstorms. But during 1940 in the Rocky Mountain area 6,623 blazes, nearly eighty-two per cent of the total, were ascribed to the crackling, flashing demon from the heavens.

That's why, at a time when every bit of our national wealth is needed to lick the Japs and the Germans, the work of the Fire Weather Service is so important. Civil authorities, lumbermen's fire protective associations, well-informed private citizens, all know the tremendous contribution of the forests to the war effort. They know the great danger that exists this summer and they're doing their best to meet it when it comes.

The alert young men with college degrees and worried looks whom the Weather Bureau maintains at its scattered observation posts and at its sprawling Washington headquarters, know about that danger, too. And upon their ability to forecast it correctly hangs a precious lot of our national safety.

CONQUEST OF FREMONT PEAK

(*Continued from page* 362)

opposite shore was a rocky island that rose from the blue water like a domed building. Clumps of spruce, which dotted the landscape near the lake, thinned out a few hundred feet above the water, for the lake lay at an elevation of almost 11,000 feet, which is close to timberline in this part of the Rockies. Across from us a white cascade came tumbling down nearly to the lake shore; while 3,000 feet higher rose the knifelike ridge of Fremont Peak, a great mass of granite, violet and gray. We were looking at the scene just as it had appeared when Fremont and Carson had burst upon it on that distant day of 1842. Island Lake is as primitive today as when it was first described in Fremont's diary; only narrow trails give evidence of the handful of men who traverse this region.

For two days we rambled around the lake, reading and re-reading Fremont's account of his visit. His campsite was easily located; and sitting there we thought it must have been only yesterday that his account was written. Here were the flat rocks beside the cascade where he spent two nights. Below was the lake with the island he described; and we even found the little vale where Fremont gathered a few botanical specimens and pressed them in his notebook.

Early the third morning we made the ascent of Fremont Peak, trying to determine from the accounts the routes by which Fremont and Carson made their first attempt, which was a failure, and the second, which ended in success. Standing at last at the summit of the peak, we beheld a stupendous view of mountain, snow and glacier. Although we knew that other peaks in the Rockies rose still higher, we could well understand Fremont's belief that he stood on the crest of the highest peak in the range. Today our maps tell us that only a short distance to the north is Gannett Peak, which tops Fremont by fifty-five feet.

From our vantage point we could see, far to the north, the Grand Teton standing guard over the famous Jackson's Hole. To the west lay the mountains through which we had come and, in the far distance, the valley of the Green River, famous scene of trapper rendezvous. To our east, from the knife edge on which we stood, was a sheer drop for some hundreds of feet down to the great masses of snow which overlay still-living glaciers sloping into the deep canyons. Far beyond we could see the open country of the great plains. To the south extended the main crest of the Rockies; we could barely make out the break that indicated South Pass. Standing here and looking out over this land so rich in historical romance, we might be pardoned for imagining for a moment that a hundred years had slipped away and we were back with Fremont as he stood on this same summit.

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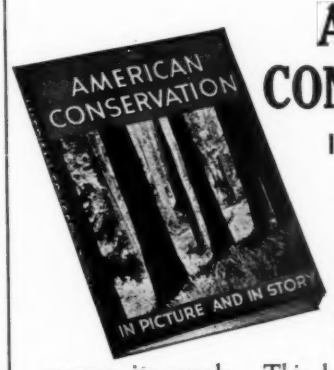

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